JSC-48500-2A

International Space Station Operations Checklist

ISS-2A

Mission Operations Directorate
Operations Division

Basic
February 6, 1998

National Aeronautics and
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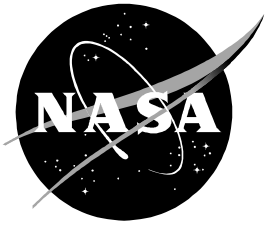
Lyndon B. Johnson Space Center
Houston, Texas



USA
United Space Alliance

INTERNATIONAL SPACE STATION OPERATIONS CHECKLIST ISS-2A

BASIC
February 6, 1998

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This document is currently under the configuration control of the Systems Operations Data File Control Board (SODFCB).

The preparation for publication of the Basic Edition of the Space Station 2A Operations Checklist required the Controlled Document Processing Area (CDPA) to perform a quality assurance (QC) review of the procedures and establish a centralized, controlled database.

A select task group of CDPA professionals concentrated on bringing the approved procedures into compliance with the Operations Data File (ODF) Standards. After extensive editing and coordination with the procedure developers, the CDPA group delivered an approved copy of each procedure to the 2A SODF Coordinator for review. The 2A Basic Operations Checklist publication is the result of this effort. This brings, for the first time, the fine work of more than 90 procedure developers into one centralized format, consistent with the current requirements of the Operations Data File Standards.

The dedicated CDPA individuals, who made a significant contribution to this publication, are acknowledged for the difficult task of ensuring the success of the 2A Operations Checklist publication.

ACKNOWLEDGEMENTS

Editorial Standards Review	Paul Hart Donald Henry
Electronic File Preparation	Tammy Walker

CONTENTS

ACTIVATION AND CHECKOUT

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EPCS SETUP

1. UNSTOW PCS

TBD PCS - Two Thinkpads
Two 25-foot DC PWR cables
If Shuttle AFD
- Two 6-foot DC PWR SPLY cables
- Two ORB 1553 Data cables
- US DC PWR SPLY

If ISS RS
- 1553 Data/power Cable
- RS DC PWR SPLY

2. VERIFY POWER OFF

If Shuttle AFD

Pwr Sply √PCS1 DC PWR SPLY PWR switch - Off
√PCS2 DC PWR SPLY PWR switch - Off

See UTILITY OUTLET PLUG-IN PLAN ORBIT CONFIGURATION (REF DATA FS, UTIL PWR) for DC UTIL PWR outlet availability

TBD √DC UTIL PWR - Off
PDIP √PDIP UTIL PWR - Off

If ISS RS

TBD √RS Power switch - Off

3. MAKE PCS POWER AND DATA CABLE CONNECTIONS

√1553 PC Card, Adapter Cable inserted in PC slot in both PCSs

If Shuttle AFD

Connect both 25-foot DC PWR SPLY cables to PCS1,2 DC PWR outlet DC PWR SPLY outlet (J2).

TBD Connect PCS1 6-foot Orb DC PWR SPLY cable to DC UTIL PWR outlet DC PWR SPLY outlet (J1).

PDIP Connect PCS2 6-foot Orb DC PWR SPLY cable to PDIP UTIL PWR outlet DC PWR SPLY outlet (J1).

PDIP Connect PCS1 Orb 1553 Data cable to (PDIP Data Port 1?) outlet 1553 PC Card Adapter Cable.

Connect PCS2 Orb 1553 Data cable to (PDIP Data Port 2?) outlet 1553 PC Card Adapter Cable.

If ISS RS

TBD Connect 1553 Data/Power Cable to PCR outlet DC PWR SPLY outlet (J1) 1553 PC Card Adapter Cable.
Connect RS Power Cable to the IOA outlet.

4. TURN ON PCS

If Shuttle AFD

TBD — DC UTIL PWR → On

Pwr Sply — PCS1 DC PWR SPLY PWR switch → On (Lt On)

PDIP — PDIP UTIL PWR → On

Pwr Sply — PCS2 DC PWR SPLY PWR switch → On (Lt On)

PCS — PCS 1,2 Thinkpad PWR switches → On

If ISS RS

TBD — RS Power switch → On

PCS — PCS Thinkpad PWR switch → On

NOTE
Let the PCS cycle through the initialization screens without any keystroke inputs. System boot takes approximately 3 to 4 minutes. Defaults are preset to select Solaris operating system and boot PCS Command and Display System Files.

5. CONNECT PCS TO MDM DATA (if MDMs are up and running)

PCS2 — After bootup when taskbar appears at bottom of display

sel Arrow directly above 'PCS' logo (as required)

sel Start/Restart PCS CDS (as required)

sel Icon to open PCSCDS Main Control Panel Window (as required)

√Status Box is Green and 'Connected' is displayed in the PCSCDS Main Control Panel Window (as required)

Iconify PCSCDS Main Control Panel Window

```
* ********************************************************************** *
*  If Status Box is not Green, select 'Connect to MDM' button            *
*  if the MDMs are on                                                    *
* ********************************************************************** *
```

NOTE

1. PCS connection to MDM is indicated by ‘Green’ in the Status Box and/or ‘Connected’ message displayed in the PCSCDS Main Control Panel Window only when the Prime Node MDM is up and running.

2. If MDMs are not up and running and step 5 is executed Expect a PCS ‘CW Server Error Msg’ and a ‘CDS Signon Fail’.

3. After connected to the MDMs if the PCS receives a Disconnect message open the PCSCDS Main Control Panel Window and select ‘Connect to MDM’ button to Reconnect. If no joy close all displays and anything iconified and redo Step 5. If still no joy, perform the Loss PCS Malfunction Procedure.

6. CONFIGURE PCS FOR NODE 1 DISPLAYS (as required)
   sel Arrow above ‘PCS’ logo
   sel Start PCS CDDF display

   After appox 1 minute,
   √‘Increment 2A Home Page’ is displayed.

   Displays may now be selected as desired.

   Inform **MCC-H** when complete.

NODE 1 INITIALIZATION

1. VERIFY OIU CONFIGURATION FOR FGB TLM

CRT SM 212 OIU

√STATUS ACTIVE DEVICES AD1 PD - FGB2
√BUS - 3
√LOCK - N/A
OIU FORMAT 001 LOAD - ITEM 1 EXEC
√FORMAT - 001
√BUS 3 BC - ∗ (ITEM 11)
√BUS 4 RT - ∗ (ITEM 14)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

2. VERIFY OIU BUS CHANNELS

NOTE
The following steps check out OIU Busses 3 and 4, side A and B.

SM 212 OIU

√BUS 3 A - ∗ (ITEM 12)
BUS 3 B - ITEM 13 EXEC (∗)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

SM 212 OIU

BUS 3 A - ITEM 12 EXEC (∗)
BUS 4 BC - ITEM 15 EXEC (∗)
BUS 3 RT - ITEM 10 EXEC (∗)
Reroute FGB-2(1) to BUS 4 - ITEM 18 +5(7) EXEC
√BUS 4 A - ∗ (ITEM 16)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

SM 212 OIU

BUS 4 B - ITEM 17 EXEC (∗)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

SM 212 OIU

BUS 4 A - ITEM 16 EXEC (∗)
BUS 3 BC - ITEM 11 EXEC (∗)
Reroute FGB-2(1) to BUS 3 - ITEM 18 + 6(8) EXEC
BUS 4 RT - ITEM 14 EXEC (∗)

SM 204 FGB

√BC SYNC - YES
√FRM CTR - incrementing

3. VERIFY FGB RACU-5 AND RACU-6 OFF

SM 204 FGB

√RACU 5 INP AMPS < 2.0
√OUT VOLTS: 0.00
√RACU 6 INP AMPS < 2.0
√OUT VOLTS: 0.00
√RACU 5 PWR OFF ∗
√6 PWR OFF ∗

Notify EV: “RACUs OFF. Go for umbilical mate.”

4. COMMAND RACU-5 and RACU-6 ON

NOTE
RACU commands sent from orbiter will not work if FGB relay matrix is in **MCC-M** command state (COMMANDING - INH). Crew can follow ground activities using the "If ENA" block below.

SM 204 FGB

√COMMANDING - INH

If COMMANDING - INH

RUSSIAN GROUND	AOS	LOS
Pass 1	___/___:___:___	___/___:___:___
Pass 2	___/___:___:___	___/___:___:___

Crew inform **MCC-H**: "FGB power umbilicals are mated."
MCC-H inform **MCC-M**: "Go for RACU 5,6 Power On."
MCC-M inform **MCC-H**: "RACU 5,6 Powered On at ___/___:___:___ GMT."
MCC-H inform crew: "RACU 5,6 Powered On at ___/___:___:___ GMT."

If COMMANDING - ENA

Crew inform **MCC-H**: "FGB power umbilicals are mated."
MCC-M inform **MCC-H**: "Go for RACU 5,6 Power On."
MCC-H inform crew: "Moscow Go for RACU 5,6 Power On."

On MCC GO

SM 204 FGB

√MAIN BUS V1,V2 VOLTS(two) : 28.0 --- 29.0
√BATT 1-6 VOLTS (six) > 25.5

```
**************************************************
*  If any BATT VOLTS < 25.5 V                    *
*      Notify MCC-H: "FGB Batteries Low.         *
*      Wait one rev for FGB battery charge."     *
**************************************************
```

00:00:00 RACU 5 PWR ON VIA FGB - ITEM 1 EXEC

00:00:30 RACU 6 PWR ON VIA FGB - ITEM 3 EXEC

SM 204 FGB

√RACU 5 PWR ON *
√INP AMPS > 3.0
√OUT VOLTS: 121 --- 125
√AMPS > 0.3

√RACU 6 PWR ON *
√INP AMPS > 3.0
√OUT VOLTS: 121 --- 125
√AMPS > 0.3

NOTE
Amperage should be @ 0.5 amps at MDM power ON. Could be as high as 10 amps after MDM initialization, approximately 2.5 minutes, depending on heater usage.

****
* If RACU 5 OUT AMPS > 10 *
* RACU 5 PWR OFF VIA FGB - ITEM 5 EXEC (*) *
* If RACU 6 OUT AMPS > 10 *
* RACU 6 PWR OFF VIA FGB - ITEM 7 EXEC (*) *
****

5. COMMAND OIU TO FORMAT 002

NOTE
1. MDM may take up to 5 minutes to warm-up and go through POST.

2. Expect possible PDI DECOM fail message.

SM 212 OIU

00:02:30 OIU FORMAT 002 LOAD - ITEM 1 +2 EXEC
√FORMAT - 002
√BUS 3 BC - * (ITEM 11)
√BUS 4 RT - * (ITEM 14)
√STATUS ACTIVE DEVICES AD1 PD - N1-2
√BUS - 4
√LOCK - YES

****
* If LOCK - NO *
* Repeat step 5 every 30 seconds until Lock - YES. *
* If 5 minutes have elapsed, *
* continue with step 6. *
****

6. CONFIGURE PCS FOR N1-2 MDM DATA
On PCS attached to PDIP N1-2 port

sel icon to open PCS CDS Main Control Panel Window and enlarge (may be buried behind displays)

√Status box green
Verify 'Connected to MDM' indicated

****
* If status box not green *
* sel Connect to MDM *
* √Status box green *
* Verify 'Connected to MDM' indicated *
****

NOTE
Expect possible increment of advisory log count PMA 1 heater failed messages.

7. VERIFY MDM N1-2 AND N1-1 STATUS VIA PCS

PCS Node 1: C&DH: MDM N1-2
Primary NCS MDM Node1
'MDM Major State'

√State - Primary
√Frame Count incrementing

'Software Control'

Configuration - 1

PCS Node 1: C&DH: MDM N1-1
Secondary NCS MDM Node1
'MDM Major State'

√State - Standby

```
          **************************************************************************
          *  If good MDM TLM via PCS but NO TLM VIA OIU, SWITCH OIU 2              *
          *     Pwr on PSP 2                                                       *
A1L       *     S-BD PL PWR SYS → 2                                                *
          *                    √SEL - PSP                                          *
          *          √CMD OUTPUT  -  P/L UMB                                       *
          *            CNTL → PNL, CMD                                             *
          *                                                                        *
CRT       *     [SM 62 PCMMU/PL COMM]                                              *
          *     Perform I/O RESET on PSP 2 - ITEM 7 EXEC                           *
          *                                                                        *
          *     MCC will configure PSP 2 for OIU COMMANDING                        *
          *                                                                        *
          *     POWER OIU 2                                                        *
          *                                                                        *
L12       *     OIU PWR → 2  (tb  -  Down)                                         *
          *                                                                        *
CRT       *     [SM 212 OIU]                                                       *
          *                                                                        *
          *     OIU FORMAT 002 - ITEM 1 +2 EXEC                                    *
          *     √FORMAT   - 002                                                    *
          *     √BUS 3 BC  - * (ITEM 11)                                           *
          *     √BUS 4 RT  - * (ITEM 14)                                           *
          *     √STATUS ACTIVE DEVICES AD 1 PD     - N1-2                          *
          *                                        √BUS    - 4                     *
          *                                        √LOCK  - YES                    *
          **************************************************************************
```

8. VERIFY MDM N1-2 STATUS VIA MCDS

CRT [SM 210 NODE]

√PRI MDM PHY ID   - N1-2
√STATE   - PRI
√CONFIG - C01
√FRM CTR incrementing

```
          **************************************************************************
          *  If no N1-2 MDM data on MCDS and none on PCS                           *
          *                                                                        *
          *    Reconfigure For TLM From MDM N1-1                                   *
          *                                                                        *
          *         [SM 212 OIU]                                                   *
          *                                                                        *
          *         BUS 4 BC - ITEM 15 EXEC (*)                                    *
          *         BUS 3 RT - ITEM 10 EXEC (*)                                    *
          *         Switch backup device - ITEM 18 +4 EXEC                         *
```

OIU FORMAT 002 LOAD - ITEM 1 +2 EXEC
√STATUS ACTIVE DEVICES AD1 PD - N1-1
√BUS - 3
√LOCK - YES

Configure PCS for N1-1 MDM Data
On PCS attached to PDIP N1-1 port
sel arrow above 'PCS' logo
sel Start/Restart PCS CDS
sel icon to open PCS CDS Main Control Panel Window

√Status box green
Verify 'connected to MDM' indicated

If Status box not green
sel 'Connect to MDM'

sel arrow above 'PCS' logo
sel Start PCS CDDF display

Home page will display when load complete (~1 minute).

SM 210 NODE 1

√PRI MDM PHY ID - N1-1
√STATE - PRI
√CONFIG - C01
√FRM CTR incrementing

PCS Node 1: C&DH: MDM N1-1
Primary NCS MDM Node1
'MDM Major State'

√State - Primary
√Frame Count incrementing

'Software Control'

√Configuration - 1

Power SDO Card (MDM Heater)
PCS Node 1: C&DH: MDM N1-1
Primary NCS MDM Node 1
'RPCM N1RS1 A'

sel RPC 5
sel Commands
cmd Close **Execute**

* √Position - Cl *
* *
* Notify **MCC-H**: MDM N1-2 failed to boot >> *
* **********

9. PROVIDE POWER TO MDM SDO CARD

PCS Node 1: C&DH: MDM N1-2
Primary NCS MDM Node1
'RPCM N1RS2 C'

sel RPC 3
sel Commands
cmd Close **Execute**
√Position - Cl

10. COMMAND N1-1 TO SEC

NOTE
First command to MDM via the OIU will initialize the command counter and must be sent again to execute.

SM 210 NODE 1

CRT √SEC MDM PHY ID - N1-1
√STATE - STBY
N1-1 TO SEC - ITEM 3 EXEC
√STATE - SEC

* **********
* If SEC MDM STATE - STBY *
* N1-1 TO SEC - ITEM 3 EXEC *
* √SEC MDM STATE - SEC *
* **********

PCS Node 1: C&DH: MDM N1-1
Secondary NCS MDM Node1
'MDM Major State'

√State - Secondary
√Frame Count incrementing

'Software Control'

√Configuration - 1

11. PROVIDE POWER TO MDM SDO CARD (MDM Heater)
'RPCM N1RS1 A'

sel RPC 5
sel Commands

cmd Close **Execute**
√Position - Cl

12. VERIFY FGB TLM VIA MDM

NOTE
The following steps verfiy that the Node MDMs are processing the FGB MDM telemetry. Any FGB display can be used. The “FGB: C&DH” page is an arbitrary choice.

PCS FGB: C&DH
FGB: C&DH

√FGB MDM 1(2) - Active (blue button)

13. VERIFY MDM HEATER STATUS

PCS Secondary NCS MDM Node1

√N1_1_Operational - Ena Ops
√Survival - Ena Ops
√N1_2_Operational - Ena Ops
√Survival - Ena Ops

14. VERIFY SHELL HEATER STATUS

PCS Node 1: TCS
Node 1: TCS
‘PMA 1’

√PMA1 Htr A (four) - Inh
√B (four) - Ena_Opr

‘NODE 1’

√NOD1 Htr A (nine) - Inh
√B (nine) - Ena_Opr

15. CHECK NODE 1 CABIN PRESSURE

PCS Node 1: ECLSS
Node1:ECLSS
‘Node 1’

√CABIN PRESS: 750 --- 770 mmHg

16. CLOSE APCU OUTPUT RELAY

CAUTION
To prevent damage to the internal converters and the relay, the APCU output relay must not be opened or closed under load (Converter - On (tb - Gray)).

(SSP2) L12L √SW PWR CB 1 - Cl

(SSP1) L12U √SW PWR CB 2 - Cl

√APCU 1,2 CONV tb (two) - bp
APCU 1,2 OUTPUT (two) → On

17. TURN APCU CONVERTER ON
APCU 1,2 CONV (two) → On (tb - Gray)
√OUTPUT tb (two) - Gray

CRT SM 200 APCU Status

√APCU 1,2 OUT VOLT RES LOW (two) > 122 V

18. ENABLE RPCM I/O

PCS Node 1: C&DH: MDM N1-1
Secondary NCS MDM Node1

sel LB SYS-LAB-1
sel RT STATUS
sel Ena_RT_Commands

cmd ENA_RPCM_N14B_C **Execute**
cmd B **Execute**
cmd A **Execute**

LB_SYS_LAB_RT_Status

√RT Inhibited 18,19, 20 - <all blank>

PCS Node 1: C&DH: MDM_N1-2
Primary NCS MDM Node1

sel LB SYS-LAB-2
sel RT STATUS
sel Ena_RT_Commands

cmd ENA_RPCM_N13B_C **Execute**
cmd B **Execute**
cmd A **Execute**

LB_SYS_LAB_RT_Status

√RT Inhibited 18,19, 20 - <all blank>

19. VERIFY LAB DATA BUS AND APCU POWER BUS CONNECTIVITY

PCS Node 1: EPS

NODE1: EPS

√N13B A, B, C (three) - Active (blue buttons)
√N14B A, B, C (three) - Active (blue buttons)

****
* If any RPCM not active, *
* √**MCC-H** *
****

20. VERIFY LB SYS LAB 1 BUS CHANNEL B

PCS Node 1: C&DH: MDM N1-1

Secondary NCS MDM Node1

'BIA'

√Mode - BC
√A - X (Active)

sel BIA

N1_1_MDM_LB SYS_LAB_1_Sel_Ch_A_B

cmd B **Execute**
√B - X (Active)

sel BIA

N1_1_MDM_LB SYS_LAB_1_Sel_Ch_A_B

cmd A **Execute**
√A - X (Active)

21. VERIFY EPS N1-14 BUS CHANNEL B

PCS Node 1: C&DH: MDM N1-2
Primary NCS MDM Node1
'SPD 0'

√Mode Ch 2 - BC
√A Ch 2 - X (Active)

sel SPD 0
sel Commands
cmd Prim_NCS_UB_EPS_N1_14_Sel_Ch_B **Execute**
√B Ch 2 - X (Active)

sel SPD 0
sel Commands
cmd Prim_NCS_UB_EPS_N1_14_Sel_Ch_A **Execute**
√A Ch 2 - X (Active)

22. VERIFY EPS N1-23 BUS CHANNEL B
'SPD 1'

√Mode Ch 1 - BC
√A Ch 1 - X (Active)

sel SPD 1
sel Commands
cmd Prim_NCS_UB_EPS_N1_23_Sel_Ch_B **Execute**
√B Ch 1 - X (Active)

sel SPD 1
sel Commands
cmd Prim_NCS_UB_EPS_N1_23_Sel_Ch_A **Execute**
√A Ch 1 - X (Active)

23. VERIFY LB SYS LAB 2 BUS CHANNEL B

PCS Node 1: C&DH: MDM N1-2

PRIMARY NCS MDM Node1

'BIA'

√Mode - BC
√A - X (Active)
sel BIA

N1_2_MDM_LB SYS_LAB_2_Sel_Ch_A_B

cmd B **Execute**
√B - X (Active)

sel BIA

N1_2_MDM_LB SYS_LAB_2_Sel_Ch_A_B

cmd A **Execute**
√A - X

NODE 1 CBM PETAL COVERSCAPTURE

OBJECTIVE:
Capture CBM deployable Petal Covers on four Node 1 radial ports prior to EVA release of the petal cover launch restraints.

LOCATION:
NODE 1/**MCC-H**

DURATION:
Four Hours

REFERENCED PROCEDURE(S):
None

NOTE
Order of execution is Port, Starboard, Zenith, Nadir.

1. VERIFY APCU POWER ON

TBD √APCU 1,2 CONVERTER tb - Gray
√APCU 1,2 OUTPUT tb - Gray

NOTE
Steps (2 --- 23) engage latches on the Node 1 Port CBM deployable cover.

2. INHIBIT PORT CBM PRIMARY RT FDIR

PCS Node 1: CDH
Node 1: C&DH

sel N1-1

Secondary NCS MDM Node 1

sel UB ORB N1 1
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 1 MDM UB ORB N1 1 Inhib FDIR

cmd Inhib FDIR CBM N1 Prt Prim **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 19 - X

3. INHIBIT PORT CBM SECONDARY RT FDIR

PCS Node 1: CDH

Node 1: C&DH

sel N1-2

Primary NCS MDM Node 1

sel UB ORB N1 2
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 2 MDM UB ORB N1 2 Inhib FDIR

cmd Inhib FDIR CBM N1 Prt Sec **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 19 - X

4. CLOSE PRIMARY RPCs

PCS S&M

N1 Active CBM Display

‘(Center Table)’

sel N1 Port
sel Command/Procedures
sel Engage N1 Port CBM Petal Covers

CBM Engage N1 Port CBM Petal Covers

cmd RPCM N1RS2 C RPC [X] CBM N1 Port Pri [Y] Cl **Execute**

[X] = 7 | 8 | 10 | 11

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display

‘N1 Port CBM Data’

√RPCM N1RS1 B RPC [X] Cntr Asy [Y] - Cl

Repeat

5. ACTIVATE PORT CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Port CBM Petal Covers

cmd CBM State to Active N1 Port Master 1 **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√N1 Port Mode - ACTV
√N1 Port State - PRI
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

6. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Port'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Port'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

7. TEST BOLT DRIVE

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Port CBM Petal Covers

CBM Engage N1 Port CBM Petal Covers

cmd CBM BBoltck nominal **Execute**
Wait 90 seconds.

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - BBCK
√Master Cmd status - CPLT

'N1 Port'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen): 0 --- 51

NOTE
Steps (8 --- 13) verify secondary power and command path.

8. DEACTIVATE PORT CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Port CBM Petal Covers

cmd CBM State to Deactivate N1 Port **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Port Mode = DEAC

9. CLOSE SECONDARY RPCs

CBM Engage N1 Port CBM Petal Covers

cmd RPCM N1RS1 B RPC [X] CBM N1 Port Sec [Y] Cl **Execute**

[X] = 5 | 6 | 13 | 14

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display
'N1 Port CBM Data'

√RPCM N1RS2 C RPC [X] Cntr Asy [Y] - Cl

Repeat

10. OPEN PRIMARY RPCs

CBM Engage N1 Port CBM Petal Covers

cmd RPCM N1RS2 C RPC [X] CBM N1 Port Pri [Y] Op **Execute**

[X] = 7 | 8 | 10 | 11

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display
'N1 Port CBM Data'

√RPCM N1RS1 B RPC [X] Cntr Asy [Y] - Op

Repeat

11. ACTIVATE PORT CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Port CBM Petal Covers

cmd CBM State to Active N1 Port Master 2 **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√N1 Port Mode - ACTV
√N1 Port State - SEC
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

12. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display
'N1 Port'

If Latch Pos (four) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**
sel	Close		

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Port'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

13. CLOSE CAPTURE LATCHES

CBM Engage N1 Port CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 10 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Port'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

14. CLOSE PRIMARY RPCs

CBM Engage N1 Port CBM Petal Covers

cmd RPCM N1RS2 C RPC [X] CBM N1 Port Pri [Y] Cl **Execute**

[X] = 7 | 8 | 10 | 11

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display
'N1 Port CBM Data'

√RPCM N1RS1 B RPC [X] Cntr Asy [Y] - Cl

Repeat

CBM Engage N1 Port CBM Petal Covers

sel Close

15. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Port'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Port'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

16. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display
'N1 Port'

If Latch Pos (four) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**
sel	Close		

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Port'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

17. DEPLOY CAPTURE LATCHES TO 45 DEGREES

NOTE
Expect MALF for Latch Cmd Stats upon completion of deploy to 45 degrees.

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Port CBM Petal Covers

CBM Engage N1 Port CBM Petal Covers

cmd CBM Deploy to 45 Degrees **Execute**
√Master Cmd status - PEND

N1 Active CBM Display
'(CBM Ring)'

√Conf Request - DPLY

CBM Engage N1 Port CBM Petal Covers

cmd CBM Confirmation Cmd **Execute**
Wait 90 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - DPLY
√Master Cmd status - FAIL

'N1 Port'

√Latch Cmd Stat (four) - MALF
√Latch Pos (four): 45 --- 49

18. CLOSE CAPTURE LATCHES

CBM Engage N1 Port CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 90 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Port'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

19. DEACTIVATE PORT CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Port CBM Petal Covers

cmd CBM State to Deactivate N1 Port **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Port Mode = DEAC

20. OPEN SECONDARY RPCs

CBM Engage N1 Port CBM Petal Covers

cmd RPCM N1RS1B RPC [X] CBM N1 Port Sec [Y] Op **Execute**

[X] = 5 6 13 14

[Y] = 1 2 3 4

N1 Active CBM Display
'N1 Port CBM Data'

√RPCM N1RS2 C RPC [X] Cntr Asy [Y] - Op

Repeat

21. OPEN PRIMARY RPCs

CBM Engage N1 Port CBM Petal Covers

cmd RPCM N1RS2 C RPC [X] CBM N1 Port Pri [Y] Op **Execute**

[X] = 7 8 10 11

[Y] = 1 2 3 4

N1 Active CBM Display
'N1 Port CBM Data'

√RPCM N1RS1 B RPC [X] Cntr Asy [Y] - Op

Repeat

22. INHIBIT CLOSE COMMAND FOR PRIMARY RPCs

N1 Active CBM Display
'N1 Port CBM Data'
'RPCM N1RS2 C (Primary Power)'

sel RPC [X] [X] = 7 | 8 | 10 | 11

RPCM N1 RS2 C:RPC#[X] Detail

sel Commands

RPCM N1RS2 C [X]

cmd Close Cmd - Inhibit **Execute**
sel Close

RPCM N1 RS2 C:RPC#[X] Detail

√Close Cmd - Inh
sel Close

Repeat

23. INHIBIT CLOSE COMMAND FOR SECONDARY RPCs

N1 Active CBM Display
'N1 Port CBM Data'
'RPCM N1RS1 B (Secondary Power)'

sel RPC [X] [X] = 5 | 6 | 13 | 14

RPCM N1 RS1 B:RPC#[X] Detail

sel Commands

RPCM N1RS1 B [X]

cmd Close Cmd - Inhibit **Execute**
sel Close

RPCM N1 RS1 B:RPC#[X] Detail

√Close Cmd - Inh
sel Close

Repeat

NOTE
Steps (24 --- 45) engage latches on the Node 1 Starboard CBM deployable cover.

24. INHIBIT STARBOARD CBM PRIMARY RT FDIR

PCS Node 1: CDH
Node 1: C&DH

sel N1-1

Secondary NCS MDM Node 1

sel UB ORB N1 1
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 1 MDM UB ORB N1 1 Inhib FDIR

cmd Inhib FDIR CBM N1 Stbd Prim **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 16 - X

25. INHIBIT STARBOARD CBM SECONDARY RT FDIR

PCS Node 1: CDH
Node 1: C&DH

sel N1-2

Primary NCS MDM Node 1

sel UB ORB N1 2
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 2 MDM UB ORB N1 2 Inhib FDIR

cmd Inhib FDIR CBM N1 Stbd Sec **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 16 - X

26. CLOSE PRIMARY RPCs

PCS S&M

N1 Active CBM Display

'(Center Table)'

sel N1 Stbd
sel Command/Procedures
sel Engage N1 Starboard CBM Petal Covers

CBM Engage N1 Starboard CBM Petal Covers

cmd RPCM N1RS2 A RPC [X] CBM N1 Stbd Pri [Y] Cl **Execute**

[X] = 5 | 6 | 10 | 11

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display

'N1 Starboard CBM Data'

√RPCM N1RS2 A RPC [X] Cntr Asy [Y] - Cl

Repeat

27. ACTIVATE STARBOARD CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM State to Active N1 Stbd Master 1 **Execute**
sel Close

N1 Active CBM Display

'(Center Table)'

√N1 Stbd Mode - ACTV
√N1 Stbd State - PRI
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

28. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Stbd'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Stbd'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

29. TEST BOLT DRIVE

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Starboard CBM Petal Covers

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM BBoltck nominal **Execute**
Wait 90 seconds.

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - BBCK
√Master Cmd status - CPLT

'N1 Stbd'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen): 0 --- 51

NOTE
Steps (30 --- 35) verify secondary power and command path.

30. DEACTIVATE STARBOARD CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM State to Deactivate N1 Stbd **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Stbd Mode = DEAC

31. CLOSE SECONDARY RPCs

CBM Engage N1 Starboard CBM Petal Covers

cmd RPCM N1RS1 C RPC [X] CBM N1 Stbd Sec [Y] Cl **Execute**

[X] = 5 6 12 13

[Y] = 1 2 3 4

N1 Active CBM Display
'N1 Starboard CBM Data'

√RPCM N1RS1 C RPC [X] Cntr Asy [Y] - Cl

Repeat

32. OPEN PRIMARY RPCs

CBM Engage N1 Starboard CBM Petal Covers

cmd RPCM N1RS2 A RPC [X] CBM N1 Stbd Pri [Y] Op **Execute**

[X] = 5 6 10 11

[Y] = 1 2 3 4

N1 Active CBM Display
'N1 Starboard CBM Data'

√RPCM N1RS2 A RPC [X] Cntr Asy [Y] - Op

Repeat

33. ACTIVATE STARBOARD CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM State to Active N1 Stbd Master 2 **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√N1 Stbd Mode - ACTV
√N1 Stbd State - SEC
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

34. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display
'N1 Stbd'

If Latch Pos (four) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**

sel Close

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Stbd'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

35. CLOSE CAPTURE LATCHES

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 10 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Stbd'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

36. CLOSE PRIMARY RPCs

CBM Engage N1 Starboard CBM Petal Covers

cmd RPCM N1RS2 A RPC [X] CBM N1 Stbd Pri [Y] Cl **Execute**
[X] = 5 6 10 11
[Y] = 1 2 3 4

N1 Active CBM Display
'N1 Starboard CBM Data'

√RPCM N1RS2 A RPC [X] Cntr Asy [Y] - Cl

Repeat

CBM Engage N1 Starboard CBM Petal Covers

sel Close

37. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Stbd'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Stbd'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

38. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display
'N1 Stbd'

If Latch Pos (four) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**
sel	Close		

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Stbd'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

39. DEPLOY CAPTURE LATCHES TO 45 DEGREES

NOTE
Expect MALF for Latch Cmd Stats upon completion of deploy to 45 degrees.

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Starboard CBM Petal Covers

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM Deploy to 45 Degrees **Execute**
√Master Cmd status - PEND

N1 Active CBM Display
'(CBM Ring)'

√Conf Request - DPLY

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM Confirmation Cmd **Execute**
Wait 30 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - DPLY
√Master Cmd status - FAIL

'N1 Stbd'

√Latch Cmd Stat (four) - MALF
√Latch Pos (four): 45 --- 49

40. CLOSE CAPTURE LATCHES

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 30 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Stbd'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

41. DEACTIVATE STARBOARD CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Starboard CBM Petal Covers

cmd CBM State to Deactivate N1 Stbd **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Stbd Mode = DEAC

42. OPEN SECONDARY RPCs

CBM Engage N1 Starboard CBM Petal Covers

cmd RPCM N1RS1 C RPC [X] CBM N1 Stbd Sec [Y] Op **Execute**

[X] = 5 | 6 | 12 | 13

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display

'N1 Starboard CBM Data'

√RPCM N1RS1 C RPC [X] Cntr Asy [Y] - Op

Repeat

43. OPEN PRIMARY RPCs

CBM Engage N1 Starboard CBM Petal Covers

cmd RPCM N1RS2 A RPC [X] CBM N1 Stbd Pri [Y] Op **Execute**

[X] = 5 | 6 | 10 | 11

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display

'N1 Starboard CBM Data'

√RPCM N1RS2 A RPC [X] Cntr Asy [Y] - Op

Repeat

44. INHIBIT CLOSE COMMAND FOR PRIMARY RPCs

N1 Active CBM Display

'N1 Starboard CBM Data'

'RPCM N1RS2 A (Primary Power)'

sel RPC [X] [X] = 5 | 6 | 10 | 11

RPCM N1 RS2 A:RPC#[X] Detail

sel Commands

RPCM N1RS2 A [X]

cmd Close Cmd - Inhibit **Execute**

sel Close

RPCM N1 RS2 A:RPC#[X] Detail

√Close Cmd - Inh

sel Close

Repeat

45. INHIBIT CLOSE COMMAND FOR SECONDARY RPCs

N1 Active CBM Display
'N1 Starboard CBM Data'
'RPCM N1RS1 C (Secondary Power)'

sel RPC [X] [X] = 5 6 12 13

RPCM N1 RS1 C:RPC#[X] Detail

sel Commands

RPCM N1RS1 C [X]

cmd Close Cmd - Inhibit **Execute**
sel Close

RPCM N1 RS1 C:RPC#[X] Detail

√Close Cmd - Inh
sel Close

Repeat

NOTE
Steps (46 --- 67) engage latches on the Node 1 Zenith CBM deployable cover.

46. INHIBIT ZENITH CBM PRIMARY RT FDIR

PCS Node 1: CDH

Node 1: C&DH

sel N1-1

Secondary NCS MDM Node 1

sel UB ORB N1 1
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 1 MDM UB ORB N1 1 Inhib FDIR

cmd Inhib FDIR CBM N1 Zen Prim **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 20 - X

47. INHIBIT ZENITH CBM SECONDARY RT FDIR

PCS Node 1: CDH

Node 1: C&DH

sel N1-2

Primary NCS MDM Node 1

sel UB ORB N1 2
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 2 MDM UB ORB N1 2 Inhib FDIR

cmd Inhib FDIR CBM N1 Zen Sec **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 20 - X

48. CLOSE PRIMARY RPCs

PCS S&M

N1 Active CBM Display

‘(Center Table)’

sel N1 Zen
sel Command/Procedures
sel Engage N1 Zenith CBM Petal Covers

CBM Engage N1 Zenith CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Zen Pri [Y] Cl **Execute**

[X] = 11 | 12 | 13 | 14

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display

‘N1 Zenith CBM Data’

√RPCM N13B B RPC [X] Cntr Asy [Y] - Cl

Repeat

49. ACTIVATE ZENITH CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM State to Active N1 Zen Master 1 **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√N1 Zen Mode - ACTV
√N1 Zen State - PRI
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

50. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Zen'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

51. TEST BOLT DRIVE

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Zenith CBM Petal Covers

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM BBoltck nominal **Execute**
Wait 90 seconds.

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - BBCK
√Master Cmd status - CPLT

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen): 0 --- 51

NOTE
Steps (52 --- 57) verify secondary power and command path.

52. DEACTIVATE ZENITH CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM State to Deactivate N1 Zen **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Zen Mode = DEAC

53. CLOSE SECONDARY RPCs

CBM Engage N1 Zenith CBM Petal Covers

cmd RPCM N14B B RPC [X] CBM N1 Zen Sec [Y] Cl **Execute**

[X] = 3 | 4 | 5 | 6
[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display
'N1 Zenith CBM Data'

√RPCM N14B B RPC [X] Cntr Asy [Y] - Cl

Repeat

54. OPEN PRIMARY RPCs

CBM Engage N1 Zenith CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Zen Pri [Y] Op **Execute**

[X] = 11 | 12 | 13 | 14

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display
'N1 Zenith CBM Data'

√RPCM N13B B RPC [X] Cntr Asy [Y] - Op

Repeat

55. ACTIVATE ZENITH CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM State to Active N1 Zen Master 2 **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√N1 Zen Mode - ACTV
√N1 Zen State - SEC
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

56. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display
'N1 Zen'

If Latch Pos (four) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**
sel	Close		

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Zen'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

57. CLOSE CAPTURE LATCHES

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 10 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Zen'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

58. CLOSE PRIMARY RPCs

CBM Engage N1 Zenith CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Zen Pri [Y] Cl **Execute**

[X] = 11 | 12 | 13 | 14

[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display
'N1 Zenith CBM Data'

√RPCM N13B B RPC [X] Cntr Asy [Y] - Cl

Repeat

CBM Engage N1 Zenith CBM Petal Covers

sel Close

59. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Zen'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Zen'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

60. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display
'N1 Zen'

If Latch Pos (four) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**
sel	Close		

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Zen'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

61. DEPLOY CAPTURE LATCHES TO 45 DEGREES

NOTE
Expect MALF for Latch Cmd Stats upon completion of deploy to 45 degrees.

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Zenith CBM Petal Covers
CBM Engage N1 Zenith CBM Petal Covers

cmd CBM Deploy to 45 Degrees **Execute**

√Master Cmd status - PEND

N1 Active CBM Display
'(CBM Ring)'

√Conf Request - DPLY

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM Confirmation Cmd **Execute**
Wait 30 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - DPLY
√Master Cmd status - FAIL

'N1 Zen'

√Latch Cmd Stat (four) - MALF
√Latch Pos (four): 45 --- 49

62. CLOSE CAPTURE LATCHES

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 30 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Zen'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

63. DEACTIVATE ZENITH CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Zenith CBM Petal Covers

cmd CBM State to Deactivate N1 Zen **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Zen Mode = DEAC

64. OPEN SECONDARY RPCs

CBM Engage N1 Zenith CBM Petal Covers

cmd RPCM N14B B RPC [X] CBM N1 Zen Sec [Y] Op **Execute**

[X] = 3 4 5 6

[Y] = 1 2 3 4

N1 Active CBM Display

'N1 Zenith CBM Data'

√RPCM N14B B RPC [X] Cntr Asy [Y] - Op

Repeat

65. OPEN PRIMARY RPCs

CBM Engage N1 Zenith CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Zen Pri [Y] Op **Execute**

[X] = 11 12 13 14

[Y] = 1 2 3 4

N1 Active CBM Display

'N1 Zenith CBM Data'

√RPCM N13B B RPC [X] Cntr Asy [Y] - Op

Repeat

66. INHIBIT CLOSE COMMAND FOR PRIMARY RPCs

N1 Active CBM Display

'N1 Zenith CBM Data'

'RPCM N13B B (Primary Power)'

sel RPC [X] [X] = 11 12 13 14

RPCM N13 B B:RPC#[X] Detail

sel Commands

RPCM N13B B [X]

cmd Close Cmd - Inhibit **Execute**

sel Close

RPCM N13 B B:RPC#[X] Detail

√Close Cmd - Inh

sel Close

Repeat

67. INHIBIT CLOSE COMMAND FOR SECONDARY RPCs

N1 Active CBM Display
'N1 Zenith CBM Data'
'RPCM N14B B (Secondary Power)'

sel RPC [X] [X] = 3 4 5 6

RPCM N14 B B:RPC#[X] Detail

sel Commands

RPCM N14B B [X]

cmd Close Cmd - Inhibit **Execute**
sel Close

RPCM N14 B B:RPC#[X] Detail

√Close Cmd - Inh
sel Close

Repeat

NOTE
Steps (68 --- 89) engage latches on the Node 1 Nadir CBM deployable cover.

68. INHIBIT NADIR CBM PRIMARY RT FDIR

PCS Node 1: CDH
Node 1: C&DH

sel N1-1

Secondary NCS MDM Node 1

sel UB ORB N1 1
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 1 MDM UB ORB N1 1 Inhib FDIR

cmd Inhib FDIR CBM N1 Nad Prim **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 17 - X

69. INHIBIT NADIR CBM SECONDARY RT FDIR

PCS Node 1: CDH

Node 1: C&DH

sel N1-2

Primary NCS MDM Node 1

sel UB ORB N1 2
sel RT Status

UB Orb RT Status

sel Inhib FDIR RT Commands

N1 2 MDM UB ORB N1 2 Inhib FDIR

cmd Inhib FDIR CBM N1 Nad Sec **Execute**
sel Close

UB Orb RT Status

√RT FDIR Inhibited Number 17 - X

70. CLOSE PRIMARY RPCs

PCS S&M

N1 Active CBM Display

'(Center Table)'

sel N1 Nad
sel Command/Procedures
sel Engage N1 Nadir CBM Petal Covers

CBM Engage N1 Nadir CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Nad Pri [Y] Cl **Execute**

[X] = 3 4 5 6

[Y] = 1 2 3 4

N1 Active CBM Display

'N1 Nadir CBM Data'

√RPCM N13B B RPC [X] Cntr Asy [Y] - Cl

Repeat

71. ACTIVATE NADIR CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM State to Active N1 Nad Master 1 **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√N1 Nad Mode - ACTV
√N1 Nad State - PRI
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

72. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Nad'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Nad'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

73. TEST BOLT DRIVE

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Nadir CBM Petal Covers

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM BBoltck nominal **Execute**
Wait 90 seconds.

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - BBCK
√Master Cmd status - CPLT

'N1 Nad'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen): 0 --- 51

NOTE
Steps (74 --- 79) verify secondary power and command path.

74. DEACTIVATE NADIR CBM PRIMARY MASTER CONTROLLER

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM State to Deactivate N1 Nad **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Nad Mode = DEAC

75. CLOSE SECONDARY RPCs

CBM Engage N1 Nadir CBM Petal Covers

cmd RPCM N14B B RPC [X] CBM N1 Nad Sec [Y] Cl **Execute**

[X] = 11 | 12 | 13 | 14
[Y] = 1 | 2 | 3 | 4

N1 Active CBM Display
'N1 Nadir CBM Data'

√RPCM N14B B RPC [X] Cntr Asy [Y] - Cl

Repeat

76. OPEN PRIMARY RPCs

CBM Engage N1 Nadir CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Nad Pri [Y] Op **Execute**

[X] = 3 4 5 6

[Y] = 1 2 3 4

N1 Active CBM Display

'N1 Nadir CBM Data'

√RPCM N13B B RPC [X] Cntr Asy [Y] - Op

Repeat

77. ACTIVATE NADIR CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM State to Active N1 Nad Master 2 **Execute**
sel Close

N1 Active CBM Display

'(Center Table)'

√N1 Nad Mode - ACTV
√N1 Nad State - SEC
√Comm Error - No X
√Bolt 1-1 Cmd Code - RELD
√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

sel BIT results

N1 Active CBM Bit Results

√No Xs

78. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display

'N1 Nad'

If Latch Pos (four) ≠ 0

N1 Active CBM Display

'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**
sel	Close		

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Nad'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

79. CLOSE CAPTURE LATCHES

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 10 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Nad'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

80. CLOSE PRIMARY RPCs

CBM Engage N1 Nadir CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Nad Pri [Y] Cl **Execute**

[X] = 3 4 5 6

[Y] = 1 2 3 4

N1 Active CBM Display
'N1 Nadir CBM Data'

√RPCM N13B B RPC [X] Cntr Asy [Y] - Cl

Repeat

CBM Engage N1 Nadir CBM Petal Covers

sel Close

81. VERIFY BOLT POSITIONS ZERO

N1 Active CBM Display
'N1 Nad'

If Bolt Pos (sixteen) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Other Commands
sel Set Bolt Position

CBM Set Bolt Position

cmd CBM Set Bolt Pos Unbolted BusA **Execute**
sel Close

N1 Active CBM Display
'(Center Table)'

√Bolt 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Nad'

√Bolt Cmd Stat (sixteen) - CPLT
√Bolt Pos (sixteen) = 0

82. VERIFY LATCH ANGLES ZERO

N1 Active CBM Display
'N1 Nad'

If Latch Pos (four) ≠ 0

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Command Templates
sel CBM Set Latch Angles Template

CBM Set Latch Angles Template

cmd	Subsystem ID Counts	4	
	RS485 Bus Select	0	
	Last Completed Command	5	
	Subsystem Identifier 17	21	
	Shaft Angle Status 17	0	
	Subsystem Identifier 18	37	
	Shaft Angle Status 18	0	
	Subsystem Identifier 19	53	
	Shaft Angle Status 19	0	
	Subsystem Identifier 20	69	
	Shaft Angle Status 20	0	**Execute**
sel	Close		

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - RELD
√Master Cmd status - CPLT

'N1 Nad'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four) = 0

83. DEPLOY CAPTURE LATCHES TO 45 DEGREES

NOTE
Expect MALF for Latch Cmd Stats upon completion of deploy to 45 degrees.

N1 Active CBM Display
'(Center Table)'

sel Command/Procedures
sel Engage N1 Nadir CBM Petal Covers

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM Deploy to 45 Degrees **Execute**
√Master Cmd status - PEND

N1 Active CBM Display
'(CBM Ring)'

√Conf Request - DPLY

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM Confirmation Cmd **Execute**
Wait 30 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code - DPLY
√Master Cmd status - FAIL

'N1 Nad'

√Latch Cmd Stat (four) - MALF
√Latch Pos (four): 45 --- 49

84. CLOSE CAPTURE LATCHES

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM Close Nominal **Execute**
Wait 30 seconds.

N1 Active CBM Display
'(Center Table)'

√Latch 1-1 Cmd Code = CLOS
√Master Cmd status = CPLT

'N1 Nad'

√Latch Cmd Stat (four) - CPLT
√Latch Pos (four): 0 --- 3

85. DEACTIVATE NADIR CBM SECONDARY MASTER CONTROLLER

CBM Engage N1 Nadir CBM Petal Covers

cmd CBM State to Deactivate N1 Nad **Execute**

N1 Active CBM Display
'(Center Table)'

√N1 Nad Mode = DEAC

86. OPEN SECONDARY RPCs

CBM Engage N1 Nadir CBM Petal Covers

cmd RPCM N14B B RPC [X] CBM N1 Nad Sec [Y] Op **Execute**

[X] = 11 12 13 14

[Y] = 1 2 3 4

N1 Active CBM Display

'N1 Nadir CBM Data'

√RPCM N14B B RPC [X] Cntr Asy [Y] - Op

Repeat

87. OPEN PRIMARY RPCs

CBM Engage N1 Nadir CBM Petal Covers

cmd RPCM N13B B RPC [X] CBM N1 Nad Pri [Y] Op **Execute**

[X] = 3 4 5 6

[Y] = 1 2 3 4

N1 Active CBM Display

'N1 Nadir CBM Data'

√RPCM N13B B RPC [X] Cntr Asy [Y] - Op

Repeat

88. INHIBIT CLOSE COMMAND FOR PRIMARY RPCs

N1 Active CBM Display

'N1 Nadir CBM Data'

'RPCM N13B B (Primary Power)'

sel RPC [X] [X] = 3 4 5 6

RPCM N13 B B:RPC#[X] Detail

sel Commands

RPCM N13B B [X]

cmd Close Cmd - Inhibit **Execute**

sel Close

RPCM N13 B B:RPC#[X] Detail

√Close Cmd - Inh

sel Close

Repeat

89. INHIBIT CLOSE COMMAND FOR SECONDARY RPCs

N1 Active CBM Display
'N1 Nadir CBM Data'
'RPCM N14B B (Secondary Power)'

sel RPC [X] [X] = 11 12 13 14

RPCM N14 B B:RPC#[X] Detail

sel Commands

RPCM N14B B [X]

cmd Close Cmd - Inhibit **Execute**
sel Close

RPCM N14 B B:RPC#[X] Detail

√Close Cmd - Inh
sel Close

Repeat

PMA1 - FGB PRESSURIZATION

PRESSURIZATION INITIALIZATION

1. **MCC-H** verify Node 1 CABIN PRESS = 750-760 mmHg(14.5-14.7 psia)

2. **MCC-H** notify **MCC-M** "Proceed with PMA 1 Pressurization"

3. EPK1, EPK2 command (two) - Enable

4. Verify EPK1, EPK2 (two) - Enabled

5. **cmd** EPK2 - Open

6. Verify pressure of FGB PMA1 PRESS 1,2 (two) ~0 (vacuum condition)

7. Record time and pressures
   DMT____:____:____(dd:hh:mm)

   FGB PMA1 PRESS 1 _____,
   FGB PMA1 PRESS 2_____

8. **MCC-M** notify **MCC-H** on initiation of PMA1 pressurization.

9. **MCC-H** notify shuttle on initiation of PMA1 pressurization.

10. **cmd** EPK1 - Open

11. **MCC-M** notify **MCC-H** pressurization in progress.

PRESSURIZATION COMPLETION

12. **MCC-H** notify shuttle pressurization in progress.

13. Wait two orbits, then
    cmd EPK1 - Close

14. **MCC-M** notify **MCC-H** on the completion of pressurization.

15. **MCC-H** notify shuttle on the completion of pressurization.

16. Wait TBD minutes for PMA1 stabilization of temperature gradients.

PMA 1/FGB INTERFACE LEAK CHECK

17. Record time and pressures and calculate initial average:

    DMT____:____:____(dd:hh:mm)
    FGB PMA1 PRESS 1 _____(mmHg)
    FGB PMA1 PRESS 2 _____(mmHg)

    Initial average (PRESS 1 + PRESS 2)/2 =_____(mmHg)

18. **MCC-M** notify **MCC-H** on the initiation of the PMA1 leak check. Report time, pressures and initial pressure as recorded in step 19 and subsequent data acquisition opportunities to **MCC-H**.

LEAK CHECK COMPLETION

19. Wait until daily orbit TBD, at data acquisition opportunity, then record time and pressures and calculate final average

    DMT____:____:____(dd:hh:mm)
    FGB PMA1 PRESS 1 _____(mmHg)
    FGB PMA1 PRESS 2 _____(mmHg)

    Final average (PRESS 1 + PRESS 2)/2 =_____(mmHg)

20 Leak check pressure decay:
    Pressure decrease = _____(mmHg)
    Initial Average - Final Average = _____(mmHg)

21. Make a plot and perform an analysis of automatically recorded telemetry data and define the pressure trend.

22. **cmd** EPK2 - Close
    cmd EPK1, EPK2 command (two) - Disabled
    Verify EPK1, EPK2 command (two) - Disabled

23. Report to **MCC-H** the results of the pressure trend analysis as recorded in step 21.

24. If pressure decrease is < 7 (TBV) mm Hg - PMA 1/FGB interface seal is tight

    MCC-M notify **MCC-H** valid seal integrity demonstrated.

    MCC-H notify shuttle on the good leak check.

25. If pressure decrease is > 7 (TBV) mm Hg - suspect leak conditions

    MCC-M notify **MCC-H** invalid seal integrity

    MCC-H notify shuttle invalid leak check.

    √**MCC-H** for further actions.

    MCC-M follow instructions from **MCC-H**.

****
* CONFIGURE FGB EPK ASSEMBLY FOR DEMATING *
* 26. **MCC-M** notify **MCC-H** “FGB configured for demating.” *
*
* CONFIGURE TC/WC FOR SECOND REPRESS *
* 27. **MCC-M** contact **MCC-H** “FGB TC configured for second repress.” *
*
* Report TC total pressure to **MCC-H**. *
*
* 28. **MCC-H** notify **MCC-M** to repeat steps 1 --- 23. *
****

NODE 1 CABIN FAN ACTIVATION

1. VERIFY APCU AND RPCM STATUS

If crew performing

SSP1 (L12U)
√APCU 1,2 CONV tb - Gray
√OUTPUT tb - Gray

If ground performing

√APCU 1,2 OUT VOLTS RES LOW ≥ 122 Volts

EPCS
Node 1: EPS: RPCM N14B [X] [X] = [A] [B] [C]

[RPCM N14B [X]]

sel RPCM Detail

√All RPCs (eighteen) Position - Op

Repeat

2. SMOKE DETECTOR SD 2 ACTIVATION

EPCS
Node 1: ECLSS: SD2

[Nod1 SD 2]

'RPCM N13B A RPC 16'

√Close Cmd - Ena

1. sel RPC Commands
   cmd Close **Execute**
   √Position - Cl

> NOTE
> If using time tagged commands, allow a minimum 2 second delay between the close RPC command and the monitor enable command to allow the smoke detector voltages to stabilize.

'Nod1 SD 2'

2. sel SD Commands
   cmd Mon Ena **Execute**
   √Act Bit In Prog - True

   Wait at least 3 seconds, then
   √Act Bit In Prog - False
   √Act Bit Fail - Operational
   √Obscuration ~0% Contam
   √Scatter ~0% obs/m
   √Mon Stat - Mon

3. ENABLE AUTOMATIC FIRE ISOLATION

EPCS Node 1: ECLSS: FDIR

Nod1 FDIR Details

sel Commands

1. **cmd** N1_1_MDM Fire Isol Ena **Execute**
   √Stat - Ena

2. **cmd** N1_2_MDM Fire Isol Ena **Execute**
   √Stat - Ena

   sel Commands

3. **cmd** N1_1_MDM IMV FDIR Ena **Execute**
   √Stat - Ena

4. **cmd** N1_2_MDM IMV FDIR Ena **Execute**
   √Stat - Ena

4. ACTIVATE NODE 1 CABIN FAN

EPCS Node 1: ECLSS: Cab Fan

Nod1 Cab Fan

'RPCM N14B B RPC 17'

√Close Cmd - Ena

1. sel RPC Commands
   cmd Close **Execute**
   √Position - Cl

   'Nod1 Cab Fan'

2. sel Fan Commands
   cmd On Execute
   √Stat - On
   √Lim Stat - Ena
   √Spd, rpm = TBD --- TBD
   √dP, mmHg= TBD --- TBD

NOTE

The Cabin fan speed must be set to a lower speed for Node air scrubbing.

If fan activation is for Node air scrubbing 'Nod1 Cab Fan'

sel Fan Commands
cmd 3400 rpm **Execute**
Wait 10 seconds, then
√Spd, rpm = 2956 --- 3844 rpm

5. SMOKE DETECTOR SD 1 ACTIVATION

EPCS

Node 1: ECLSS: SD1

Nod1 SD 1

'RPCM N14B C RPC 03'

√Close Cmd - Ena

1. sel RPC Commands
   cmd Close **Execute**
   √Position - Cl

NOTE
If using time tagged commands, allow a minimum 2 second delay between the close RPC command and the monitor enable command to allow the smoke detector voltages to stabilize.

'Nod1 SD 1'

2. sel SD Commands
   cmd Mon Ena **Execute**
   √Act Bit In Prog - True

   Wait 3 seconds, then
   √Act Bit In Prog - False
   √Act Bit Fail - Operational
   √Obscuration ~0% Contam
   √Scatter ~0% obs/m
   √Mon Stat - Mon

6. ACTIVATE NODE 1 FORWARD IMV VALVES

Node 1: ECLSS: Fwd Port IMV Vlv

Nod1 Fwd Port IMV Vlv

'RPCM N13B C RPC 14'

√Close Cmd - Ena

1. sel RPC Commands
   cmd Close **Execute**
   √Position - Cl

   'Nod1 Fwd Port IMV Vlv'

2. sel Vlv Commands
   cmd On Execute
   √Stat - Op
   √Ena Stat - On

Node 1: ECLSS: Fwd Stbd IMV Vlv
Nod1 Fwd Stbd IMV Vlv
'RPCM N13B C RPC 13'

√Close Cmd - Ena

3. sel RPC Commands
   cmd Close **Execute**
   √Position - Cl

   'Nod1 Fwd Stbd IMV Vlv'

4. sel Vlv Commands
   cmd On Execute
   √Stat - Op
   √Ena Stat - On

NODE 1 CABIN FAN DEACTIVATION

1. DEACTIVATE NODE 1 CABIN FAN

EPCS Node 1: ECLSS: Cab Fan
Nod1 Cab Fan
'Nod1 Cab Fan'

1. sel Fan Commands
cmd Off **Execute**
√Stat - Off
√Lim Stat - Inh
√Spd, rpm - Decreasing

'RPCM N14B B RPC 17'

√Open Cmd - Ena

2. sel RPC Commands
cmd Open **Execute**
√Position - Op

2. SMOKE DETECTOR 1,2 DEACTIVATION

Node 1: ECLSS: SD1
Nod1 SD 1
'Nod1 SD 1'

1. sel SD Commands
cmd Mon Inh **Execute**
√Mon Stat - Not Mon

'RPCM N14B C RPC 03'

√Open Cmd - Ena

2. sel RPC Commands
cmd Open **Execute**
√Position - Op

Node 1: ECLSS: SD2
Nod1 SD 2
'Nod1 SD 2'

3. sel SD Commands
cmd Mon Inh **Execute**
√Mon Stat - Not Mon

'RPCM N13B A RPC 16'

4. sel RPC Commands
cmd Open **Execute**
√Position - Op

FILTER PANELS PREPARE FOR FLIGHT OPS - NODE 1

OBJECTIVE:
Remove bolts (twenty-eight) from each Filter Panel.

LOCATION:
Midbay Nadir NOD1D3-1,3

DURATION:
17 minutes

PARTS
None

MATERIALS
Tape
Ziploc Bag

TOOLS REQUIRED:
Power Driver
Kit H:
5/32” Hex Head, 1/4” Drive

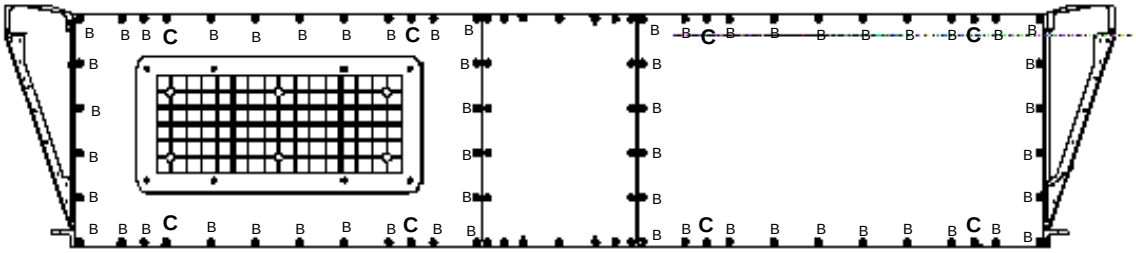


Figure 1.- Front view of Filter Panels with bolts and fasteners. The fasteners marked C are captive. The bolts marked B are non-captive.

REMOVE

NOTE
There are twenty-eight bolts and four fasteners securing each panel. The bolts are to be removed and stowed in a Ziploc Bag.

1. Remove bolts (twenty-eight) from each panel (two) and stow in Ziploc Bag, then loosen and snug fasteners on each panel (four) (Power Driver, 5/32” Hex Head).

POST MAINTENANCE
2. Stow tools, equipment.

PRE-INGRESS EQUIPMENT SETUP

TOOLS REQUIRED:
Short Flat Tip Screwdriver

1. PORTABLE FAN SETUP

MDxxx
1. Unstow: Portable Fan Assemblies (four)
2. Unstow: D-Cell Batts (16)
3. Deploy fan
4. √Fan power (four) - Off
5. √Fan Speed select switch position (four) - full CCW
6. Open Batt compartment on each fan.
7. Install Batts (four) in each fan, close compartment.
8. Fan power (four) → On
9. √Fan is running
10. Fan power (four) → Off
11. Fold fan closed.
12. Unstow flex brackets (four).
13. Attach fans (four) to flex brackets.
14. Stow fan and bracket assemblies (four) in tool bag for ingress.

ORBITER TO ISS AIR DUCT SETUP
TBD

2. ISS O2 EXTENTION HOSE SETUP

MDxxx
1. Unstow ISS O2 extension hose segments (four).
2. Connect extension segments to form two 60 foot extension segments.
3. Tmpry stow extension segments.

NODE 1 ECLSS EQUIPMENT CHECKOUT

1. VERIFY IMV FDIR

EPCS
Node 1: ECLSS: FDIR
Nod1 FDIR Details

√N1_1 MDM IMV FDIR Stat - Ena
√N1_2 MDM IMV FDIR Stat - Ena

2. VERIFY APCU STATUS

SSP1
(L12U)
√APCU 1,2 CONVERTER tb - Gray
√APCU 1,2 OUTPUT tb - Gray

3. AFT STBD IMV VALVE CHECKOUT

EPCS
Node 1: ECLSS: Aft Stbd IMV Vlv
Nod1 Aft Stbd IMV Vlv
'RPCM N14B C RPC 04'

√Close Cmd - Ena
sel RPC Commands
cmd Close **Execute**
√Position - Cl

'Nod1 Aft Stbd IMV Vlv'

√Stat - Off
√Ena Stat - Off

sel Vlv Commands
cmd On **Execute**
√Op - Not Op
√Cl - Cl
√Stat - Cl
√Ena Stat - On

sel Vlv Commands
cmd Open **Execute**
√Stat - In Trans
Wait 20 seconds, then
√Stat - Op

sel Vlv Commands
cmd Close **Execute**
√Stat - In Trans
Wait 20 seconds, then
√Stat - Cl

4. AFT PORT IMV VALVE CHECKOUT

EPCS Node 1: ECLSS: Aft Port IMV Vlv
Nod1 Aft Port IMV Vlv
'RPCM N14B C RPC 05'

√Close Cmd - Ena
sel RPC Commands
cmd Close **Execute**
√Position - Cl

'Nod1 Aft Port IMV Vlv'

√Stat - Off
√Ena Stat - Off

sel Vlv Commands
cmd On **Execute**
√Op - Not Op
√Cl - Cl
√Stat - Cl
√Ena Stat - On

sel Vlv Commands
cmd Open **Execute**
√Stat - In Trans
Wait 20 seconds, then
√Stat - Op

sel Vlv Commands
cmd Close **Execute**
√Stat - In Trans
Wait 20 seconds, then
√Stat - Cl

5. FWD STBD IMV VALVE CHECKOUT

EPCS Node 1: ECLSS: Fwd Stbd IMV Vlv
Nod1 Fwd Stbd IMV Vlv
'RPCM N13B C RPC 13'

√Position - Cl

'Nod1 Fwd Stbd IMV Vlv'

√Stat - Op
√Ena Stat - On

sel Vlv Commands
cmd Close **Execute**
√Stat - In Trans
Wait 20 seconds.
√Stat - Cl

sel Vlv Commands
cmd Open **Execute**
√Stat - In Trans
Wait 20 seconds, then
√Stat - Op

6. FWD PORT IMV VALVE CHECKOUT

EPCS Node 1: ECLSS: Fwd Port IMV Vlv
Nod1 Fwd Port IMV Vlv
'RPCM N13B C RPC 14'

√Position - Cl

'Nod1 Fwd Port IMV Vlv'

√Stat - Op
√Ena Stat - On

sel Vlv Commands
cmd Close **Execute**
√Stat - In Trans
Wait 20 seconds, then
√Stat - Cl

sel Vlv Commands
cmd Open **Execute**
√Stat - In Trans
Wait 20 seconds, then
√Stat - Op

7. IMV VALVE POWER DOWN
Forward Port IMV Valve

EPCS Node 1: ECLSS: Fwd Port IMV Vlv
Nod1 Fwd Port IMV Vlv
'Nod1 Fwd Port IMV Vlv'

sel Vlv Commands
cmd Off **Execute**
√Stat - Off
√Ena stat - Off

'RPCM N13B C RPC 14'

√Open Cmd - Ena
sel RPC Commands
cmd Open **Execute**
√Position - Op

Forward Starboard IMV Valve

EPCS
Node 1: ECLSS: Fwd Stbd IMV Vlv
Nod1 Fwd Stbd IMV Vlv
'Nod1 Fwd Stbd IMV Vlv'

sel Vlv Commands
cmd Off **Execute**
√Stat - Off
√Ena stat - Off

'RPCM N13B C RPC 13'

√Open Cmd - Ena
sel RPC Commands
cmd Open **Execute**
√Position - Op

Aft Port IMV Valve

EPCS
Node 1: ECLSS: Aft Port IMV Vlv
Nod1 Aft Port IMV Vlv
'Nod1 Aft Port IMV Vlv'

sel Vlv Commands
cmd Off **Execute**
√Stat - Off
√Ena stat - Off

'RPCM N14B C RPC 05'

√Open Cmd - Ena
sel RPC Commands
cmd Open **Execute**
√Position - Op

Aft Starboard IMV Valve

EPCS
Node 1: ECLSS: Aft Stbd IMV Vlv
Nod1 Aft Stbd IMV Vlv
'Nod1 Aft Stbd IMV Vlv'

sel Vlv Commands
cmd Off **Execute**
√Stat - Off
√Ena stat - Off

'RPCM N14B C RPC 04'

√Open Cmd - Ena
sel RPC Commands
cmd Open **Execute**
√Position - Op

PMA 2 INGRESS

TOOLS AND EQUIPMENT REQUIRED

Unstow, place in tool bag:

- APAS Hatch Tool (two)
- Alcohol Pads (for APAS hatch seal)
- Station Portable Fire Extinguisher (CO_2 Bottle)
- O-rings for IMV Caps (two sets of two)
- D-Cell BATTs (sixteen)
- Air Sample Bottles (four)
- Desiccant/Shroud Assemblies (four)
- Spotlight
- Towel
- 4-inch Ratchet Wrench, 1/4" Drive
- TBD-inch Extension, 1/4" Drive
- 1/4" to 3/8" Adapter, 1/4" Drive
- 7/16" Deepwell Socket, 1/4" Drive
- 5/32" Hex Head Driver, 1/4" Drive
- Universal Joint, 3/8" Drive
- 4-inch Adjustable Wrench
- General Purpose Tape (2")
- Nylon Wire Tie Wraps
- Tie Wrap Cutting Tool
- Connector Pliers
- Short Flat Tip Screwdriver
- Velcro

Unstow:

- Shuttle/Station Air Duct Assembly
- PMA IMV Duct Extension
- Portable Fan Assemblies (four)
- ISS O_2 Extension Segments (two)
- FGB Harmful Impurities Cartridge
- Empty "Return to Houston" Bag

SETUP QDMS FOR INGRESS CONTINGENCY SUPPORT

1. Retrieve ISS O_2 Extension Segments (two).
   Disconnect two QDMs from existing O_2 lines.
   Connect a QDM to one end of each of the ISS O_2 Extension Segments.

C7 2. √LEH O_2 SPLY 1,2 Vlv (two) - Op

MO32M LEH O_2 7,8 Outlet (two) →|← Free-end of one QDM/ISS O_2 Extension Segment connects to each outlet
LEH O_2 7,8 Vlv (two) → Op

3. Route both QDM/ISS O_2 Extension Segments to Ext A/L.

SETUP EXTERNAL AIRLOCK FOR ODS & PMA INGRESS

4. Relocate Tool Bag, Shuttle/Station Air Duct Assembly, PMA IMV Duct Extension, and Portable Fan Assemblies, “Return to Houston” bag to Ext A/L.

MO13Q 5. cb Depress MN A(B) SYS 1(2) Vent → Cl
ESS1BC(2CA) SYS 1(2) Vent ISOL → Cl
√VEST DEP VLV SYS 1(2) VENT - Cl (tb - Cl)
ISOL → Cl (tb - Cl)
cb Depress MN A(B) SYS 1(2) Vent → Op
ESS1BC(2CA) SYS 1(2) Vent ISOL → Op

NOTE
Expect possible dP/dt klaxon if vestibule requires repressurization.

ODS HATCH 6. EQUAL VLV (one) → Norm
√ODS Hatch ΔP ≤ 0.2 psid

INGRESS ODS VESTIBULE

7. Open ODS Hatch per decal.
EQUAL VLV (one) → Off, cap installed

CAUTION
Surfaces may be below freezing for a short time after initial ODS hatch opening. Avoid direct contact with vestibule surfaces until SHUTTLE VESTIBULE TEMP 1,2 (two) indicate > 40 degF (SM 211 DM STATUS ODS INTERFACE).

Insert ODS air duct extension into vestibule.
Wipe any condensate from vestibule volume using the towel.

8. √**MCC-H**: “Go for Node 1 Ingress.”

OPEN APAS HATCH

APAS Hatch 9. APAS EQUAL VLV → Op

SPEC 66 ENVIRONMENT

AFD 10. When CABIN dP/dT < 0.01 (~5 minutes)

Open APAS Hatch:
Select ‘ÐÀÁ Î ×ÅÅ’ (WORKING) torque setting on APAS Hatch Tool.
Insert tool in hatch socket.
Rotate tool 3-4 turns in direction of ‘ Î ÒÊÐ’ (Open) arrow until it clicks.

****
* If tool prematurely slips or does not engage: *
* Select 'ÀÂÀÐÉÉ Í Î Å' (EMERGENCY) setting *
* on hatch tool. *
* Reattempt to open Hatch. *
****

Remove tool.
Open Hatch.
Tether tool on hatch handle.
Secure hatch in open position using fixing device.

SHUTTLE/STATION AIR DUCT INSTALLATION

MO13Q 11. ARLK/TNL FAN A(B) → Off

EXT A/L 12. Disconnect R&R with external A/L duct from halo cross air duct.
Obtain Shuttle/Station Air Duct Assembly and connect to air inlet flex duct.

13. Secure Shuttle/Station Air Duct Assembly with TBD to TBD.

PMA 2 14. Remove band clamp and cap from PMA 2 hard duct.
Stow cap on side of hard duct with pre-positioned velcro.

15. Connect free end of Shuttle/Station Air Duct Assembly to PMA 2 hard duct inlet with band clamp.
Secure band clamp with over-center latch.

16. Remove Velcro strap from PMA 2 hard duct grille assembly (near duct connection just made).
Verify grille cover open.

MO13Q ARLK/TNL FAN A(B) → On
√Airflow at grille

PMA2/ Node 1 I/F 17. Remove V-band clamp and flange saver from starboard IMV flange.
Tmpry stow V-band in TBD for use later in this step.
Stow flange saver in bag (to be used in PMA1 Ingress).

Disconnect PMA 2 Flex duct from launch support.
Tmpry stow V-band in TBD for use later in this step.

18. Connect PMA 2 Flex duct to PMA IMV extension duct with V-band clamp.
Secure V-band clamp with over-center latch.
Tighten V-band clamp with Ratchet and Deepwell Socket.

19. Route PMA IMV duct extension around top perimeter of Node 1/PMA 2 interface.
Connect other end of PMA/Node 1 duct extension to Node 1 starboard IMV flange with V-band clamp.
Secure V-band clamp with over-center latch.
Tighten V-band clamp with Ratchet and Deepwell Socket.

Secure PMA IMV duct extension around top perimeter of Node 1/PMA 2 interface with Velcro straps.

Node 1 Fwd Hatch

20. Remove launch hatch restraint pin.
Stow pin in “Return to Houston” bag.

PMA 2

21. Close grille cover on PMA 2 hard duct.

NODE 1 INGRESS

TOOLS REQUIRED:
Station Portable Fire Extinguisher
Portable Fan Assemblies (four)
5/32” Hex Head Driver, 1/4” Drive
4 inch Ratchet Wrench, 1/4” Drive
General Purpose Tape (2 inches)

VERIFY NODE 1 POWER CONFIGURATION

SSP1 (L12U)
1. √APCU 1,2 CONV tb - Gray
   √OUTPUT tb - Gray

EPCS
Node 1: ECLSS: Cab Fan
Nod 1 Cab Fan

2. √Cab Fan Stat - On

PROVIDE POWER TO NODE 1 INTERNAL LIGHTS

3. Node 1: EPS: RPCM N13B A
   RPCM N13B A

   sel RPCM Detail
   sel RPC [x] [x] = 5 13

   cmd Close Cmd - Enable **Execute**
   cmd Close **Execute**
   cmd Close Cmd - Inhibit **Execute**
   √RPC Position - Cl

   Repeat

   Node 1: EPS: RPCM N13B B
   RPCM N13B B

   sel RPC 1
   sel Commands
   cmd Close Cmd - Enable **Execute**
   cmd Close **Execute**
   cmd Close Cmd - Inhibit **Execute**
   √RPC Position - Cl

   Node 1: EPS: RPCM N13B C
   RPCM N13B C

   sel RPC 1
   sel Commands
   cmd Close Cmd - Enable **Execute**
   cmd Close **Execute**
   cmd Close Cmd - Inhibit **Execute**
   √RPC Position - Cl

Node 1: EPS: RPCM N14B B
RPCM N14B B

sel RPC 1
sel Commands
cmd Close Cmd - Enable **Execute**
cmd Close **Execute**
cmd Close Cmd - Inhibit **Execute**
√RPC Position - Cl

Node 1: EPS: RPCM N14B-C
RPCM N14B C

sel RPCM Detail
sel RPC [x] [x] = 2 | 15 | 16

cmd Close Cmd - Enable **Execute**
cmd Close **Execute**
cmd Close Cmd - Inhibit **Execute**
√RPC Position - Cl

Repeat

CREW INGRESS

Node 1 Fwd Hatch

4. Open Node 1 Forward Hatch per decal.

NOTE
It may take 30 minutes for cold lights to come up full bright.
Lights must come up to full bright before turning them off.

Node 1 Fwd Endcone

5. NODE 1 General Lighting pb - On
√Node 1 Interior Lights (eight) - Full Bright

Collect air samples (two) from inside Node 1 using Air Sample Bottle.
Stow air sample bottles (two) in “Return to Houston” bag.

Node 1

NODE 1OS2-1 Interior Light pb - Off
NODE 1OP2-1 Interior Light pb - Off
NODE 1OP2-2 Interior Light pb - Off

Node 1 Fwd Port Locker

Install station portable fire extinguisher.
Remove launch restraint bolts (four) from fire extinguisher locker doors.
Stow bolts (four) in “Return to Houston” bag.

NODE 1 PORTABLE FAN CONFIGURATION

6. Retrieve Portable Fans (four) from bag and install on seat track according to Figure 1.

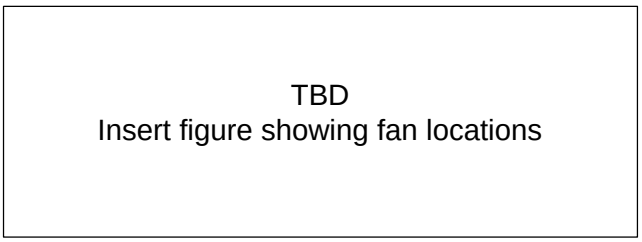


Figure 1.- Fan locations.

NODE 1 PPRV CONFIGURATION

Node 1 xx_xx

7. Unstow PPRV Caps.

Node 1 Port, Stbd Hatch

Install Caps on Node 1 Port and Stbd PPRV.

NODE 1 NPRV VERIFICATION

Node 1 D4-xx

8. Stbd Fwd NPRV

Unstow Crew Foot Restraints as needed.

Node 1 S2-13

Install crew foot restraint on foot bridge.
Unfasten captive fasteners (four) using 5/32” Hex Head and Ratchet.
Tmpry stow captive fasteners (four) with General Purpose Tape (2”).
Remove Closeout Panel NOD1S2-13.
√N1 Stbd Fwd NPRV Cover - Cl
Replace Closeout Panel.
Fasten captive fasteners (four) using 5/32” Hex Head and Ratchet

Node 1 S2-33

9. Stbd Aft NPRV

Unfasten captive fasteners (four) using 5/32” Hex Head and Ratchet.
Tmpry stow captive fasteners (four) with General Purpose Tape (2”).
Remove Closeout Panel NOD1S2-33.
√N1 Stbd Aft NPRV cover - Cl
Replace Closeout Panel.
Fasten captive fasteners (four) using 5/32” Hex Head and Ratchet.
Remove crew foot restraint.

Node 1 P2-33 10. Port Fwd NPRV

Install crew foot restraint on foot bridge.
Unfasten captive fasteners (four) using 5/32” Hex Head and Ratchet.
Tmpry stow captive fasteners (four) with General Purpose Tape (2”).
Remove Closeout Panel NOD1P2-33.
√N1 Port Fwd NPRV Cover - Cl
Replace Closeout Panel.
Fasten captive fasteners (four) using 5/32” Hex Head and Ratchet.

PMA 1 INGRESS

TOOLS AND EQUIPMENT REQUIRED:
Flashlight
Ratchet 1/4" Drive
TBD Extension
TBD Torque Wrench
7/16" Deepwell Socket, 1/4" Drive
Velcro

CREW INGRESS

NOTE
Expect Klaxon when MPEV valve is opened.

Node 1 Aft Hatch

1. Remove MPEV Cap.
   Stow.
   MPEV → Op
   Wait 3 minutes.

AFD

SPEC 66 ENVIRONMENT
When CABIN dP/dT < 0.01

2. Open Node 1 Aft Hatch per decal.

   Notify **MCC-H**, "Node 1 Aft Hatch is Open".

   MCC-H notify **MCC-M**: "You have a go to open the Pressure Equalization Valve between the FGB Pressurized Adapter and PMA 1."

PMA1 IMV DUCT CONFIGURATION

PMA 1 xx_xx

3. Remove with Rachet and Deepwell Socket and tmpry stow
   V-band clamp
   IMV Cap from Node 1 IMV Aft Port
   Stbd Duct (two)
4. With combination of Ratchet and Deepwell Socket, install flange saver (removed during PMA2 Ingress) on NOD1 IMV Aft Stbd Duct flange.
5. Disconnect PMA 1 Air Duct Jumper from launch support.
   Tmpry stow V-band.
6. Connect PMA 1 Air Duct Jumper to Node 1 Aft Port IMV Flange with V-band clamp.
   Secure V-band clamp with over-center Latch.
   Tighten V-band with Ratchet and Deepwell Socket.
7. Remove Velcro straps (three) from PMA 1 air duct jumper.
   Remove band clamp from PMA 1 hard duct.
   Attach other end of PMA 1 air duct jumper to hard duct with band clamp.
   Secure clamp with over-center Latch.

8. Remove band clamp from PMA 1 hard duct and cap.
   Stow cap on side of hard duct with pre-positioned Velcro.
   Stow band clamp in TBD.

Node 1
xx_xx

9. Node 1 Aft Port IMV valve → Op
   Stow handle

Node 1
Aft
Hatch

10. MPEV → Cl (capped)

FGB INGRESS

TOOLS AND EQUIPMENT REQUIRED:
Spotlight
General Purpose Tape (2-inch)
4-inch Adjustable Wrench
APAS Hatch Tool
Alcohol Pads (for APAS Hatch Seal)
"Return to Houston" Bag
Two Air Sample Bottles

CRT — SPEC 66 ENVIRONMENT

1. When CABIN dP/dT < 0.01 (~15 min)

EPCS — FGB: ECLSS

FGB: ECLSS

√FGB Nod1 PEV - Op

2. INGRESS PA

FGB — Per **MCC-H**, open FGB PA APAS Hatch

APAS Hatch
1. Select 'ÐÀÁ Î ×ÅÅ' (WORKING) torque setting on hatch tool.
2. Insert tool in hatch socket.
3. Rotate 6 to 7 turns in direction of ' Î ÒÊÐ' (Open) arrow until it clicks.

```
**********************************************************
* If tool prematurely slips or does not engage          *
*    Select 'ÀÂÀÐÉÉ Í Î Å' (EMERGENCY) setting           *
*    on hatch tool.                                     *
*    Reattempt to open hatch.                           *
**********************************************************
```

4. Verify all latches are opened.
5. Remove tool.
6. Open Hatch.
7. Secure Hatch in open position using fixing device.
8. Inform **MCC-H** of PA Hatch opening complete.

PA Port Panel Ù Î -Ë Î
3. PA AND ICC LIGHTING ACTIVATION
1. 1-Ë1 (switch) → On (switch up)
2. √LEDs■ Ä1,2,3,4 (four) - Off

NOTE
Light switch 5-Ë1 is non-functional.

PA Port
4. READY OC Ï -4 FIRE EXTINGUISHER IN PA
1. Remove blue launch restraint bolts (four) from clamps (two) with common screwdriver. Tmpry stow clamps and bolts.

PA Ovhd
5. È Ï K-1 GAS MASK READINESS
1. Remove lock wire from cap and dispose in Trash Bag.

PA
6. INGRESS ICC
1. **On MCC-H GO**, open FGB PA-ICC Hatch
   Rotate hatch handle in direction of OPEN (OTÊPÜITO) position.
   Open Hatch until Hatch clicks and stops.

2. Inform **MCC-H**, PA-ICC Hatch is opened.

7. TAKE AIR SAMPLES OF FGB
   1. Collect air samples (two) from inside FGB using Air Sample Bottles

ICC Port 8. ICC LIGHTING ACTIVATION
Panel 414 1. 1-Ë1 (switch) → On (switch up)
Ù Î -Ë Î √LEDs ■ Ä1,2,3,4 (four) - Off
Panel 430 2. 1-Ë1 (switch) → On (switch up)
Ù Î -Ë Î √LEDs ■ Ä1,2,3,4 (four) - Off

NOTE
Light switch 5-Ë1 is non-functional on panels 430 and 414.

9. PA-ICC HATCH BULKHEAD RING INSTALLATION

Panel 402 1. Remove protective ring by unsecuring two restraint clips from launch restraint brackets using TBD wrench and unloosen two restraint straps.

NOTE
If time available, remove four launch restraint bolts from the two launch restraint brackets with common screwdriver. Dispose of blue launch restraint bolts and brackets in trash bag.

PA-ICC Hatch 2. Unfold protective ring and connect protective ring brackets on hatch hinge pin. Verify bracket mechanisms locked to hinge pin.

3. Secure bottom portion of protective ring alignment pin on socket of handle mechanism assembly. Rotate hatch handle in direction of close (ÇAÊPÜITO) position.

10. ALARM CONTROL PANEL ACTIVATION

ICC Panel TBD 1. POWER → On
√□ FUSE (Light on)
√LED ■ F1 - Off
√TTS/LOCAL - LOCAL
2. TEST pb - Push and Hold
√◪ - CL (blinking)
√□ All other lights and LEDs on.
√□ Siren activated.
3. TEST pb - Release
√□ FUSE Light on
√LED ■ F1 - Off
√■ All other lights and LEDs - Off
√Siren off

11. INSTALL AIR DUCTING

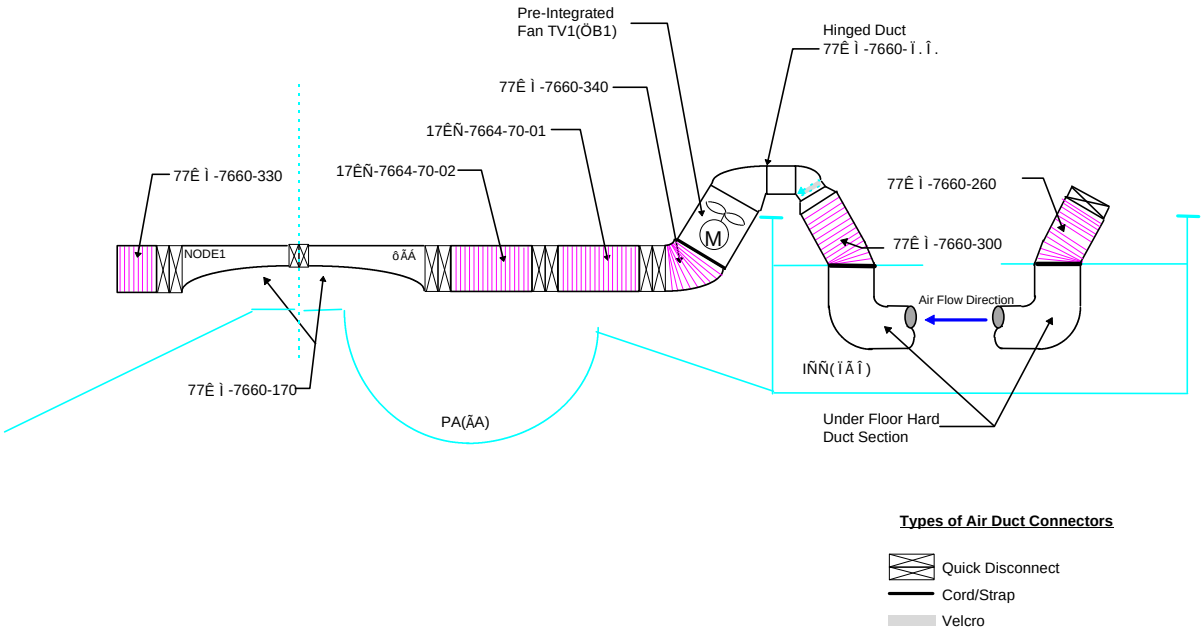


Figure 1.- Air duct connections.

PA	1.	Deploy duct rotator device.
ICC Panel 102	2.	Remove launch restraint tape from flexible duct (77KM-7660-300) and unfold.
PA	3.	Secure free-end of flexible air duct (77KM-7660-300) using Velcro on end of duct rotator device.
ICC Behind Panel 202	4.	Open TBD container (77KM-7660-280). Retrieve flexible duct(77KM-7660-340).
PA	5.	Using strap, connect flexible duct (77KM-7660-340) to flange of the TV1(ÖB1) fan.
Panel 202	6.	Unstow flexible air duct (77KC-7664-70-01).
PA	7.	Connect flexible air duct (77KC-7664-70-01) and connect with flexible air duct (77KM-7660-340).
Panel 202	8.	Unstow flexible air duct (77KC-7664-70-02).
PA	9.	Connect flexible air duct (77KC-7664-70-02) and connect with flexible air duct (77KC-7660-70-01).
ICC Panel 204	10.	Remove FGB rigid air duct (77KM-7660-170) by unsecuring two restraint clamps using TBD tool. Tmpry stow bolts.

ICC Panel 204
11. Remove Node 1 rigid air duct (77KM-7660-170) by unsecuring two restraint clamps using TBD tool.
Tmpry stow bolts.

PMA1-PA Hatch
12. Connect FGB rigid air duct and Node 1 rigid air duct.

PA
13. Connect free-end of flexible air duct (17KC-7664-70-02) to FGB rigid air duct.

ICC Behind Panel 202
14. Retrieve flexible air duct (77KM-7660-330).

PMA1
15. Connect free-end of flexible air duct (17KM-7660-330) to Node 1 rigid air duct.

16. Detach cap to PMA 1 hard duct inlet.
Stow cap.

17. Connect free-end of flexible air duct to PMA 1 duct inlet and secure with flat band coupling.

Panel 229
12. READY OCÏ-4 FIRE EXTINGUISHER IN ICC
1. Remove blue launch restraint bolts (four) from clamps (two) with common screwdriver.
Tmpry stow clamps and bolts.

Panel 230
13. È Ï K-1 GAS MASK READINESS IN ICC
1. Remove lock wire from cap and dispose in Trash Bag.

ACTIVATE NODE 1 - FGB INTERMODULE VENTILATION

EPCS
Node 1: ECLSS
NODE 1: ECLSS

sel Node_1_Aft_Port_IMV_Fan

14. √Close Cmd - Ena
sel RPC Commands
cmd Close **Execute**
√Position - Close

NODE 1: Aft Port IMV Fan
sel Fan Commands
cmd On **Execute**
√Stat - In Trans

NODE 1: Aft Port IMV Fan
Wait 15 seconds.
√Stat - On
√Spd, rpm = 7462 --- 9500

EARLY COMMUNICATION INSTALLATION NODE 1

OBJECTIVE:
Installation of Early Communication (Early Comm) System

LOCATION:
Installed: NOD1S4
Stowed: Shuttle Airlock

DURATION:
70 minutes

PARTS:
Early Comm Plate Assemblies and Cables (P/N 684-10276)

MATERIALS:
Tape, Ziploc Bags

TOOLS REQUIRED:
35mm camera

Shuttle Tools:
Locker Drawer #1:
- Multimeter Kit

Locker Drawer #2:
- Connector Pliers

Locker Drawer #3:
- Ratchet 1/4" Drive
- 1/4" to 3/8" Adapter
- 6" Ext., 1/4" Drive
- 4" Ext., 1/4" Drive
- 7/16" Socket, 3/8" Drive
- 3/16" Hex Head Driver, 3/8" Drive
- 5/32" Hex Head Driver, 3/8" Drive
- (30-200 in-lbs) Trq Wrench 1/4" Drive

Locker Drawer #4:
- 7/16" Combination Wrench

SAFE

1. Verify Op RPCs for RPCM N1RS1 C
   PCS nav: Node 1: EPS: RPCM N1RS1 C
   [RPCM N1RS1 C]

   sel RPCM [N] DETAILS [N] = [5], [6], [12], [13]

   √RPC [N] Position - Op
   √RPC [N] Close Cmd - Inh

   Repeat

2. Verfiy Op RPCs for RPCM N1RS2 A
   PCS nav: Node 1: EPS: RPCM N1RS2 A
   RPCM N1RS2 A

   sel RPCM [N] DETAILS [N] = 5 , 6 , 10 , 11

   √RPC [N] Position - Op
   √RPC [N] Close Cmd - Inh

   Repeat

UNSTOW

3. Obtain Early Comm hardware and tools from stowed location in Shuttle. Translate them to the Node starboard rack position.

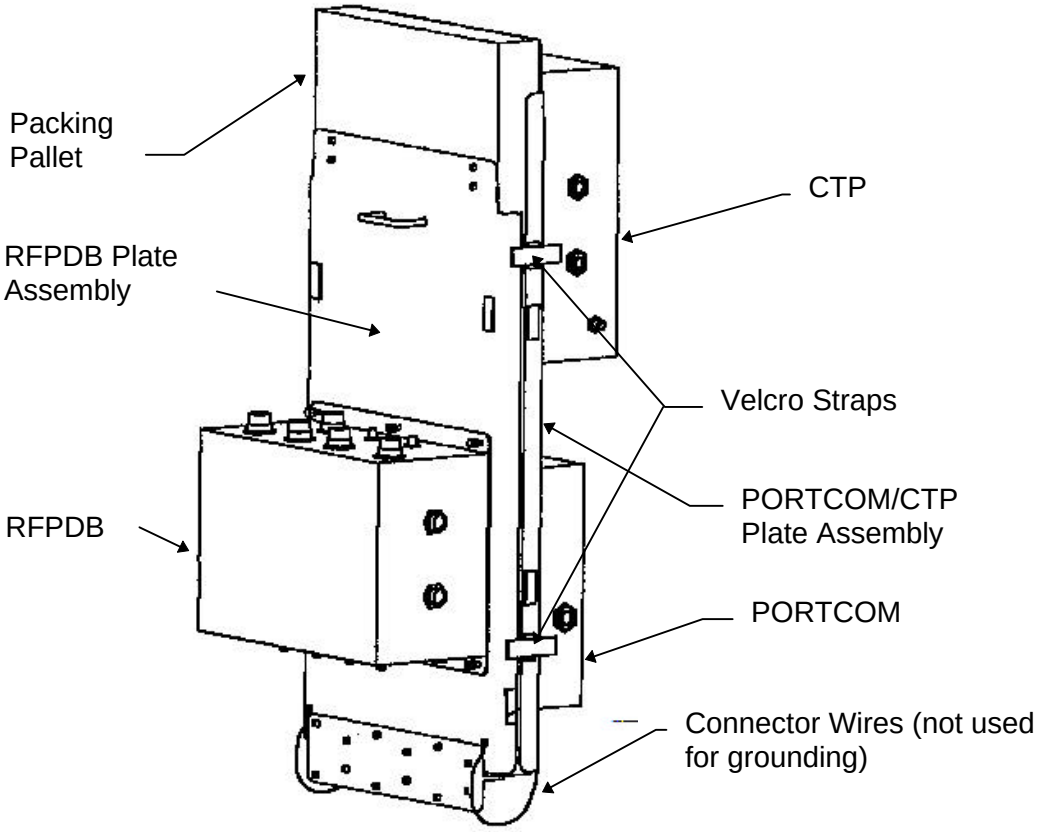


Figure 1.- Early Comm hardware in stowed configuration.

4. Remove Starboard rack Closeout Panel(s). Temporary stow panel(s).

5. Remove plate assemblies from stowage bag.
   Unfold pre-integrated cables and position out of way.

6. Release Velcro straps on both sides of plate assemblies (four). See Figure1.

7. Unfold plate assemblies from stowed position. Temporary stow packing pallet.

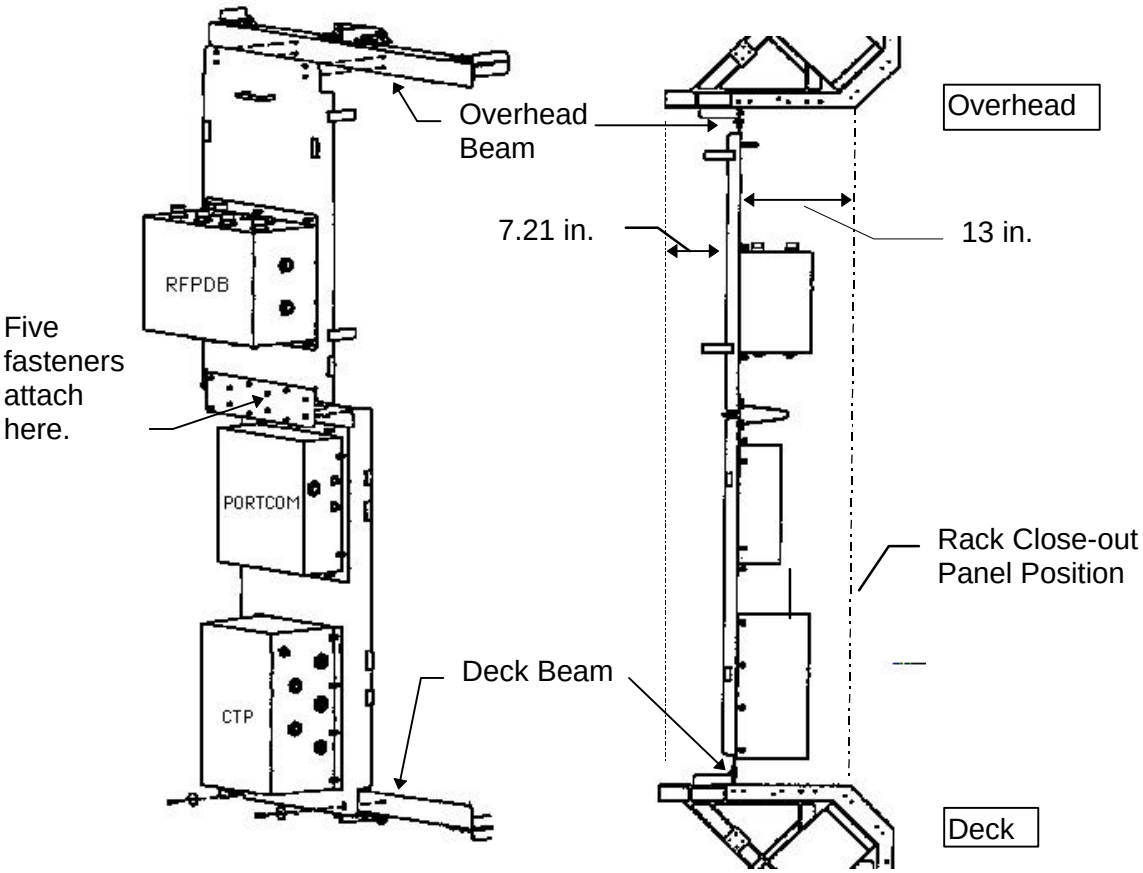


Figure 2.- Exploded and installed side view of Early Comm assembly.

NOTE
Install bolts and fasteners prior to torquing.

8. Attach RF Power Dist Box (RFPDB) plate to the PORTCOM/CTP plate, tighten fasteners (five), (Ratchet 1/4" Drive, 1/4" to 3/8" Adapter, 3/16" Hex Head Driver, 3/8" Drive, 6" Extension). See Figure 2.

INSTALL

9. Attach RFPDB end of plate assembly to Overhead beam. Snug fasteners (four) (Ratchet 1/4" Drive, 1/4" to 3/8" Adapter, 3/16" Hex Head Driver, 3/8" Drive, 6" and 4" Extension). See Figure 2.

NOTE
The two bolts used to secure the PORTCOM/CTP end of the assembly are stored on that plate.

10. Remove stowed bolts from PORTCOM/CTP plate.

11. Attach PORTCOM/CTP end of plate assembly to Deck beam and snug bolts (two) (Ratchet 1/4” Drive, 1/4” to 3/8” Adapter, 7/16” Socket, 6” and 4” Extension). See Figure 2.

12. Torque fasteners (four) on Overhead beam to 43 in-lbs (1/4” to 3/8” Adapter, 3/16” Hex Head, 4” Extension, (30-200 in-lbs) Trq Wrench).

13. Torque bolts (two) on Deck beam to 43 in-lbs (1/4” to 3/8” Adapter, 4” and 6” Extension, (30-200 in-lbs) Trq Wrench).

14. Install grounding straps and check bond with multimeter TBD.

15. Remove Closeout Panels NOD1OS2-27, NOD1SD2 (22,23) (starboard hatch overhead and deck), 5/32” internal hex fasteners (three). (Ratchet 1/4” Drive, 5/32” Hex Head, 1/4” to 3/8” Adapter).

NOTE
Refer to Figure 3 for steps 16 --- 29.

Figure 3. TBD

16. Secure all cables to secondary structure using pre-integrated Velcro before connection.

STARBOARD DECK BULKHEAD CONNECTORS

17. W0143 (EO), P85 ←|→ J85

18. Remove cap from JE85 and install on J85.

19. W0143 (EO), P85 →|← JE85, NV85/RFPDB1

20. W0205 (RF), P84 ←|→ J84

21. Remove Cap from JE84 and install on J84.

22. W0205 (RF), P84 →|← JE84, ND84/CTP3

STARBOARD OVERHEAD BULKHEAD CONNECTORS

23. W0144 (EO), P97 ←|→ J97

24. Remove cap from JE97 and install on J97.

25. W0144 (EO), P97→|← JE97, NV97/RPDB2

26. W0204 (RF), P96 ←|→ J96

27. Remove Cap from JE96 and install on J96.

28. W0204 (RF), P96 →|← JE96, ND96/CTP4

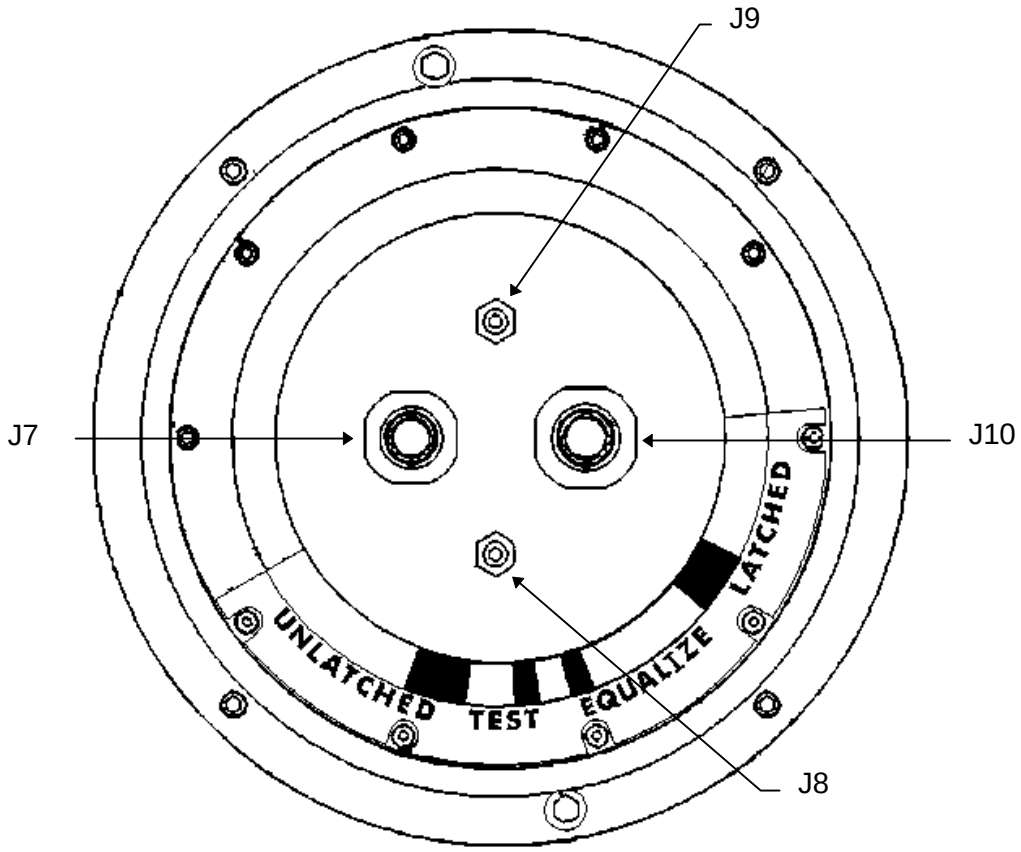


Figure 4.- Port and Starboard Hatch Plate.

HATCH PLATE CONNECTORS

Table 1.- Early Comm Hatch Plate Connections

CABLE	CONNECTOR PLUG	CONNECTOR JACK
Port Hatch		
PHP7/RPDB3	P7	J7
PHP8/RPDB12	P8	J8
PHP9/RPDB11	P9	J9
PHP10/RPDB16	P10	J10
Starboard Hatch		
SHP7/RPDB4	P7	J7
SHP8/RPDB14	P8	J8
SHP9/RPDB13	P9	J9
SHP10/RPDB17	P10	J10

29. Remove connector caps (sixteen), stow in Ziploc Bag, and mate connectors (eight) per Table 1 and Figure 4.

CLOSE-OUT

30. Replace Closeout Panels (starboard hatch overhead and deck). See step 15. TBD number of 5/32” internal hex fasteners (Ratchet 1/4” Drive, 5/32” Hex Head, 1/4” to 3/8” Adapter).

POST MAINTENANCE

31. Enable RPC Close Cmd for RPCM N1RS1 C
    PCS nav: Node 1: EPS: RPCM N1RS1 C
    RPCM N1RS1 C

    sel RPCM [N] DETAILS [N] = 5 , 6 , 12 , 13

    √RPC [N] Position - Op
    √RPC [N] Close Cmd - Enable

    Repeat

32. Enable RPC Close Cmd for RPCM N1RS2 A
    PCS nav: Node 1: EPS: RPCM N1RS2 A
    RPCM N1RS2 A

    sel RPCM [N] DETAILS [N] = 5 , 6 , 10 , 11

    √RPC [N] Position - Op
    √RPC [N] Close Cmd - Enable

    Repeat

33. Tape Ziploc Bag containing connector caps to Early Comm Plate Assembly.

34. Photo document after inspection prior to rack volume close-out.

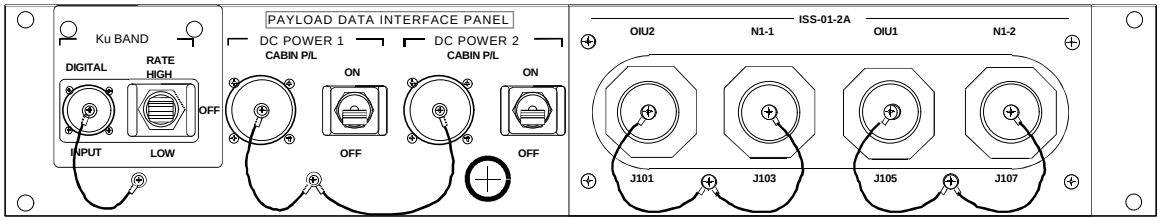
35. Stow tools.

TBD 36. Take tools and supplies TBD back to the orbiter and stow.

EARLY COMM INITIAL ACTIVATION

1. **MCC** to verify Early Comm System RPC Close Inhibits removed.

NOTE
The following RPCs are used for Early Comm. Close inhibit must be removed prior to attempting to command the RPCs to close. N1RS1C RPC 5, 6, 12, 13 N1RS2A RPC 5, 6, 10, 11



Payload Data Interface Panel (PDIP) L12/A3

Orb L12 2. Verify no PCS active on UB-ORB-N1-1(2) bus in Orb AFD.

```
**************************************************************************
*  If PCS active on either bus                                           *
*       Perform EPCS Deactivation, step 1 (SODF: C&DH), then             *
**************************************************************************
```

POWER ON RF PWR DIST BOX SWITCHES

NOD1 S4_xx 3. Configure switches located on RF PWR DIST BOX ORU
- PGSC/RF → On
- CTP → On
- XCVR → On
- SBANT → On
- PTANT → On

√SPARE - Off

4. Verify mode switch is in Low Rate position on CTP.
   √MODE SWITCH - LOW RATE CMD/TLM

POWER ON RF PWR DIST BOX

Orb SM 203 EARLY COMM

5. N1RS2A RPC 11 - ITEM 15 EXEC (*)

NOD1 S4_xx 6. Verify power LEDs on RF PWR DIST BOX ORU.
- √TX SW PWR - RED
- √RCV SW PWR - RED

POWER ON ANTENNA HEATERS

Orb SM 203 EARLY COMM

7. N1RS1C RPC 6 - ITEM 3 EXEC (*)
   N1RS1C RPC 13 - ITEM 7 EXEC (*)

POWER ON CTP

8. N1RS2A RPC 10 - ITEM 13 EXEC (*)

NOD 1
S4_xx

9. Verify LEDs on CTP
   √CTP POWER - GREEN
   √CCC STATUS - GREEN/YELLOW (alternating)
   √CTP 1553B BUS - GREEN (flashing)

Orb

SM 203 EARLY COMM

10. √CTP POST - PASS
    √DECRYPT POST - PASS
    √PORT ANT I/F - ERR
    √STBD ANT I/F - ERR
    √PORTCOM I/F - ERR

POWER ON TRANSCEIVER

11. N1RS2A RPC 5 - ITEM 9 EXEC (*)
    Wait 1 minute.
    √PORTCOM I/F - OK
    √SYS MODE - LO (ITEM 21)
    √PTG MODE - AUTO (ITEM 23)

NOD1
S4_xx

12. Verify power LEDs on Transceiver.
    √+5V POWER - GREEN
    √-5V POWER - GREEN
    √+12V POWER - GREEN

POWER ON ANTENNAS

Orb

SM 203 EARLY COMM

13. √XMIT - OFF (ITEM 18)
    N1RS1C RPC 5 - ITEM 1 EXEC (*)
    N1RS1C RPC 12 - ITEM 5 EXEC (*)

NOTE

Power to antenna electronics is thermostatically controlled to prevent applying power below operating limits. When antenna I/F telemetry is received, the antenna electronics are receiving power.

√PORT ANT I/F - OK
√STBD ANT I/F - OK
√Port Ant Temp ≥ 144 (-35 deg C)
√Stbd Ant Temp ≥ 144 (-35 deg C)

ESTABLISH LOW RATE COMMUNICATIONS LINK

14. **MCC-H** to verify ground and TDRSS network configured for comm.

    MCC-H to Shuttle: “Ready for XMIT ON.”

Orb SM 203 EARLY COMM

15. √FRM LOCK PORTCOM - YES
    √FRM LOCK CTP - YES
    √SIG STR ≥ 100
    XMIT ON - ITEM 17 EXEC (*)

    Shuttle to **MCC-H**: “XMIT ON.”

MCC-H COMMANDS TO EARLY COMM

> NOTE
> Ground commanding through Early Comm link used to command during this portion of procedure to test command capability.

nav Early Comm
Early S-Band Comm Management
‘System Configuration’

16. sel Key Sel
    cmd Decryption_Key_999 **Execute**

    √Decryption_Key - 999
    sel Decryption
    cmd Decryption_On **Execute**

    √Decryption - On
    GC configures FEP for encryption with key 999

    ‘Antenna Command Display’

17. sel Port Array
    cmd Port_Array_Beam_Select_13 **Execute**

    √Array - Port
    √Beam Sel - 13

    sel Stbd Array
    cmd Stbd_Array_Beam_Select_0 **Execute**

    √Array - Stbd
    √Beam Sel - 0

EARLY COMM VIDEO CHECKOUT

VIDEO TELECONFERENCE PREP

1. Perform OCA SETUP, all (SODF:TBD), then:

VIDEO TELECONFERENCE CHECKOUT

PGSC 2. sel 'Shuttle Apps' icon, then
sel 'OCA' icon
sel 'OCA Proshare Video' icon

NOTE
Video T/C takes ~30 seconds to start.

3. √Video active in 'LOCAL' window

4. Adjust Thinkpad display tilt-angle, camera position, iris.
Focus so operator's face centered in 'LOCAL' video window.

5. √Picture quality and position

```
**************************************************
*  If picture quality poor                       *
*       From 'LOCAL' video window:               *
*       sel 'Adjust Video' (slide bar icon)      *
*       Adjust picture quality as required       *
*       sel 'Close'                              *
*       If 'Save camera control settings?'       *
*       appears, sel 'Yes' button                *
*                                                *
*       √'Zooms in' button (mag glass) in out    *
*       position                                 *
**************************************************
```

Node/ FGB 6. Shuttle to **MCC-H**: "GO for video teleconference checkout."

7. Wait for **MCC** to initiate call.

NOTE
Video teleconference will last approximately 15 minutes to test video/audio quality and auto pointing algorithm of Early Comm System.

CONDUCT VIDEO TELECONFERENCE

NOTE
Video teleconference performance may be affected if other applications are active.

8. √Remote video window active, audio active.
   Move remote video window directly beneath camera.
   Use 'Split' button to move window separate from handset.
   Adjust audio volume using slide bar under remote video window.

NOTE
When video teleconference completed, either side can terminate call. If **MCC** has disconnected, 'Hang Up' button will change to 'Dial'.

PCS 9. Crew configures Early Comm System mode to LO
   nav Early Comm
   Early S-Band Comm Management
   'System Configuration'

   sel Sys Mode
   cmd Sys Mode LO **Execute**

   √SYS MODE - LO

PGSC 10. sel system menu (upper-left corner)
   sel 'Exit' (Alt-Shift-F4)

VIDEO TELECONFERENCE TEARDOWN

11. Go to OCA DEACT, all (SODF: TBD).

NODE 1 ALCOVE DECK SHEAR PANEL REMOVAL

OBJECTIVE**:**
To remove Shear Panels from Node 1 Alcove Deck Structure and attach to the back of Node 1 Alcove Deck Closeout Panel.

LOCATION:
Installed: Node 1 Alcove Deck Structure
Stowed: Attach to Alcove Deck Closeout Panel

DURATION:
TBD

PARTS:
None

MATERIALS:
Plastic Bag

TOOLS REQUIRED:
Equipment Bag
Kit D:
- 5/32” Hex Head Driver, 1/4” Drive

Kit E:
- Driver Handle 1/4” Drive
- 6” Ext 1/4” Drive

Kit F:
- 7/16” Socket, 1/4” Drive

Kit G:
- (5-35 in-lbs) Trq Driver

Kit TBD:
- Power Driver

REFERENCED PROCEDURE(S):
None

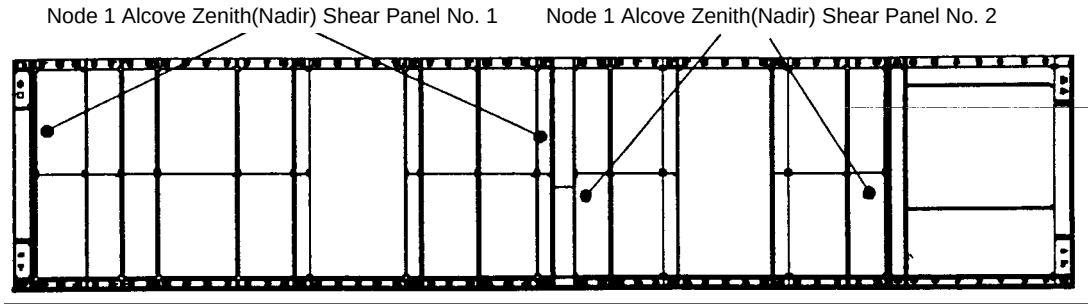


Figure 1.- Node 1 Alcove Deck Shear Panel No.1 and No.2.

ACCESS

1. Remove, temporary stow Alcove Deck Closeout Panel, fasteners (ten) (5/32” Hex Head Driver, Driver Handle 1/4” Drive).

REMOVE

2. Remove hex head screws (fifty-six) Alcove Deck Shear Panel No. 1. Stow screws (except four) in plastic bag (7/16” Socket, Power Driver).

3. Install Shear Panel No. 1 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (7/16” Socket, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

4. Remove hex head screws (thirty-four) on Alcove Deck Shear panel No. 2, stow screws (except four) in plastic bag (7/16” Socket, Power Driver).

5. Install Shear Panel No. 2 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (7/16” Socket, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

REPLACE

6. Install Alcove Deck Closeout Panel. Tighten captive fasteners (ten), torque to 14 ± 2 in-lbs (5/32” Hex Head Driver, 6” Ext , (5-35 in-lbs) Trq Driver).

NODE 1 ALCOVE OVHD SHEAR PANEL REMOVAL

OBJECTIVE**:**
To remove Shear Panels from Node 1 Alcove Ovhd Structure and attach to the back of Node 1 Alcove Ovhd Closeout Panel.

LOCATION:
Installed: Node 1 Alcove Ovhd Structure
Stowed: Attach to Alcove Ovhd Closeout Panel

DURATION:
TBD

PARTS:
None

MATERIALS:
Plastic Bag

TOOLS REQUIRED**:**
Equipment Bag
Kit D:
- 5/32” Hex Head Driver, 1/4” Drive
- 1/4” Hex Head Driver, 1/4” Drive

Kit E:
- Driver Handle 1/4” Drive
- 6” Ext 1/4” Drive

Kit F:
- 7/16” Socket 1/4” Drive

Kit G:
- (5-35 in-lbs) Trq Driver

Kit TBD:
- Power Driver

REFERENCED PROCEDURE(S):
None

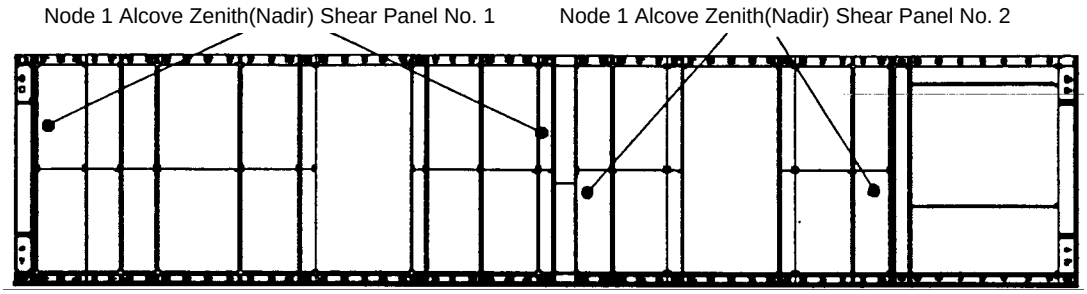


Figure 1.- Node 1 Alcove Ovhd Shear Panel No.1 and No.2 (Closeout Panel Removed).

ACCESS

1. Remove, temporary stow Alcove Ovhd Closeout Panel, fasteners (ten) (5/32” Hex Head Driver, Driver Handle 1/4” Drive).

REMOVE

2. Remove hex head screws (fifty-six) Alcove Ovhd Shear panel No. 1. Stow screws (except four) in plastic bag (7/16” Socket, Power Driver).

3. Install Shear Panel No. 1 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (7/16” Socket, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

4. Remove hex head screws (thirty-four) on Alcove Ovhd Shear Panel No. 2. Stow screws (except four) in plastic bag (7/16” Socket, Power Driver).

5. Install Shear Panel No. 2 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (7/16” Socket, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

REPLACE

6. Install Alcove Ovhd Closeout Panel, tighten captive fasteners (ten), torque to 14 ± 2 in-lbs (5/32” Hex Head Driver, 6” Ext., (5-35 in-lbs) Trq Driver).

NODE 1 ALCOVE PORT SHEAR PANEL REMOVAL

OBJECTIVE:
To remove Shear Panels from Node 1 Alcove Port Structure and attach to the back of Node 1 Alcove Port Closeout Panel.

LOCATION:
Installed: Node 1 Alcove Port Structure
Stowed: Attach to Alcove Port Closeout Panel

DURATION:
TBD

PARTS:
None

MATERIALS:
Plastic Bag

TOOLS REQUIRED:
Equipment Bag
Kit D:
- 5/32” Hex Head Driver, 1/4” Drive

Kit E:
- Driver Handle 1/4” Drive
- 6” Ext. 1/4” Drive

Kit F:
- 3/8” Socket 1/4” Drive

Kit G:
- (5-35 in-lbs) Trq Driver

Kit TBD:
- Power Driver

REFERENCED PROCEDURE(S):
None

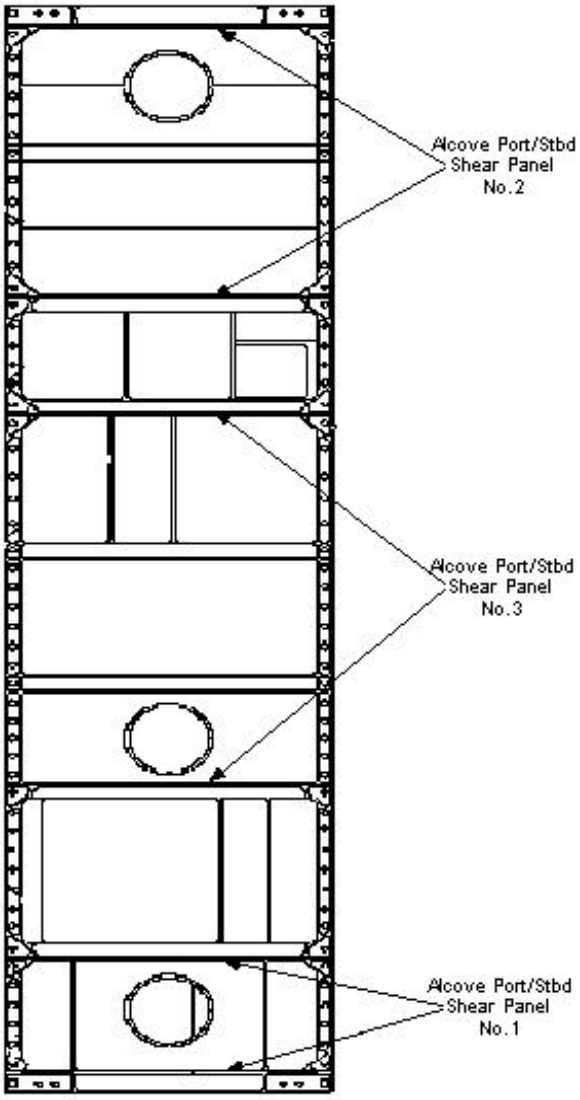


Figure 1.- Node 1 Alcove Port Shear Panels No.1, No. 2, and No. 3 (Closeout Panel removed).

ACCESS

1. Remove, temporary stow Alcove Port Closeout Panel, fasteners (fourteen) (5/32” Hex Head Driver, Driver Handle 1/4” Drive).

REMOVE

2. Remove hex screws (twelve) Alcove Port Shear Panel No. 1. Stow screws (except four) in plastic bag (3/8” Socket 1/4” Drive, Power Driver).

3. Install Shear Panel No. 1 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 $\pm$ 2 in-lbs (3/8” Socket 1/4” Drive, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

4. Remove hex screws (thirty-six) Alcove Port Shear Panel No. 3. Stow screws (except four) in plastic bag (3/8" Socket 1/4" Drive, Power Driver).

5. Install Shear Panel No. 3 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (3/8" Socket 1/4" Drive, Driver Handle 1/4" Drive, (5-35 in-lbs) Trq Driver).

6. Remove hex screws (twenty-six) Alcove Port Shear Panel No. 2. Stow screws (except four) in plastic bag (3/8″ Socket 1/4″ Drive, Power Driver).

7. Install Shear Panel No. 2 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (3/8″ Socket 1/4″ Drive, Driver Handle 1/4″ Drive, (5-35 in-lbs) Trq Driver).

REPLACE

8. Install Alcove Port Closeout Panel, tighten captive fasteners (fourteen), torque to 14 ± 2 in-lbs (5/32″ Hex Head Driver, 6″ Ext., (5-35 in-lbs) Trq Driver).

NODE 1 ALCOVE STBD SHEAR PANEL REMOVAL

OBJECTIVE**:**
To remove Shear Panels from Node 1 Alcove Stbd Structure and attach to the back of Node 1 Alcove Stbd Closeout Panel.

LOCATION:
Installed: Alcove Stbd Structure
Stowed: Attached to Alcove Stbd Closeout Panel

DURATION:
TBD

PARTS:
None

MATERIALS:
Plastic Bag

TOOLS REQUIRED:
Equipment Bag
Kit D:
    5/32” Hex Head Driver, 1/4” Drive
Kit E:
    Driver Handle 1/4” Drive
    6” Ext 1/4” Drive
Kit F:
    3/8” Socket 1/4” Drive
Kit G:
    (5-35 in-lbs) Trq Driver
Kit TBD:
    Power Driver

REFERENCED PROCEDURE(S):
None

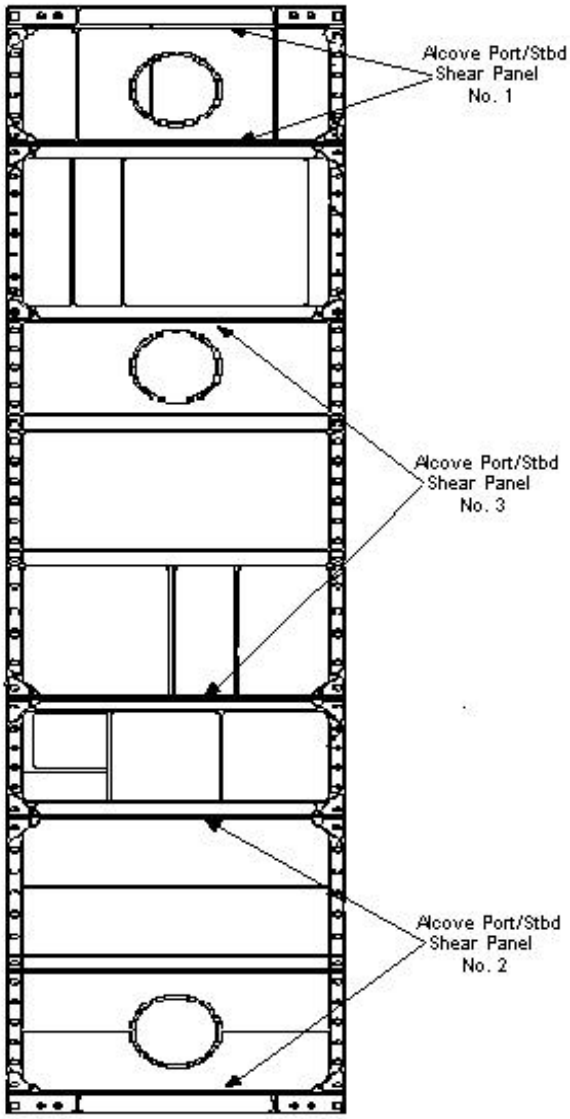


Figure 1.- Node 1 Alcove Stbd Shear Panels No.1, No.2, and No. 3 (Closeout Panel removed).

ACCESS

1. Remove, temporary stow Alcove Port Closeout Panel, fasteners (fourteen) (5/32” Hex Head Driver, Driver Handle 1/4” Drive).

REMOVE

2. Remove hex screws (twenty-six) Alcove Stbd Shear Panel No. 2. Stow screws (except four) in plastic bag (3/8” Socket 1/4” Drive, Power Driver).

3. Install Shear Panel No. 2 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (3/8” Socket 1/4” Drive, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

4. Remove hex screws (thirty-six) Alcove Stbd Shear Panel No. 3. Stow screws (except four) in plastic bag (3/8” Socket 1/4” Drive, Power Driver).

5. Install Shear Panel No. 3 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (3/8” Socket 1/4” Drive, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

6. Remove hex screws (twelve) Alcove Stbd Shear Panel No. 1. Stow screws (except four) in plastic bag (3/8” Socket 1/4” Drive, Power Driver).

7. Install Shear Panel No. 1 to back of Closeout Panel. Tighten remaining hex screws (four), torque to 27 ± 2 in-lbs (3/8” Socket 1/4” Drive, Driver Handle 1/4” Drive, (5-35 in-lbs) Trq Driver).

REPLACE

8. Install Alcove Stbd Closeout Panel, tighten captive fasteners (fourteen), torque to 14 ± 2 in-lbs (5/32” Hex Head Driver, 6” Ext., (5-35 in-lbs) Trq Driver).

CBM CONTROLLER ASSEMBLY REMOVAL NODE 1 FWD

OBJECTIVE:
This procedure improves access within the Node 1 Forward vestibule volume by removing all of the CBM Controller Assemblies mounted on the corresponding ACBM ring.

LOCATION:
Installed: Node 1 Active CBM Docking Ring

DURATION:
1 hour

PARTS:
CBM Controller Assembly Storage Container: Part No. TBD
CBM Controller Assembly (P/N 683-13621-3) (Same as Allied Signal P/N 2355260-1)

MATERIALS:
None

TOOLS REQUIRED:
Equipment Bag
Kit E:
    Ratchet 3/8" Drive
Kit C:
    7/16" Socket, 3/8" Drive
Kit D:
    5/32" Hex Head, 3/8" Drive
IVA Tool Box, Lid # 1:
    Static Wrist Tether

REFERENCED PROCDURES:
None

SAFE

WARNING

Failure to remove power can result in electrical shock hazard.

1. Verify Primary, Secondary RPCs supplying applicable CBM are Op.

PCS S&M
N1 Fwd CBM Display
'Controller Panel Assy Power/Data Status'

√RPCM N13B C RPC [X] Cntr Assy [Y]	[X] =	3	4	5	6
	[Y] =	1	2	3	4
√RPCM N14B A RPC [X] Cntr Assy [Y]	[X] =	2	3	14	15
	[Y] =	1	2	3	4

CAUTION

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

2. Don static wrist tether.
   Secure clip end to unpainted metal surface.

REMOVE

See Figure 1.

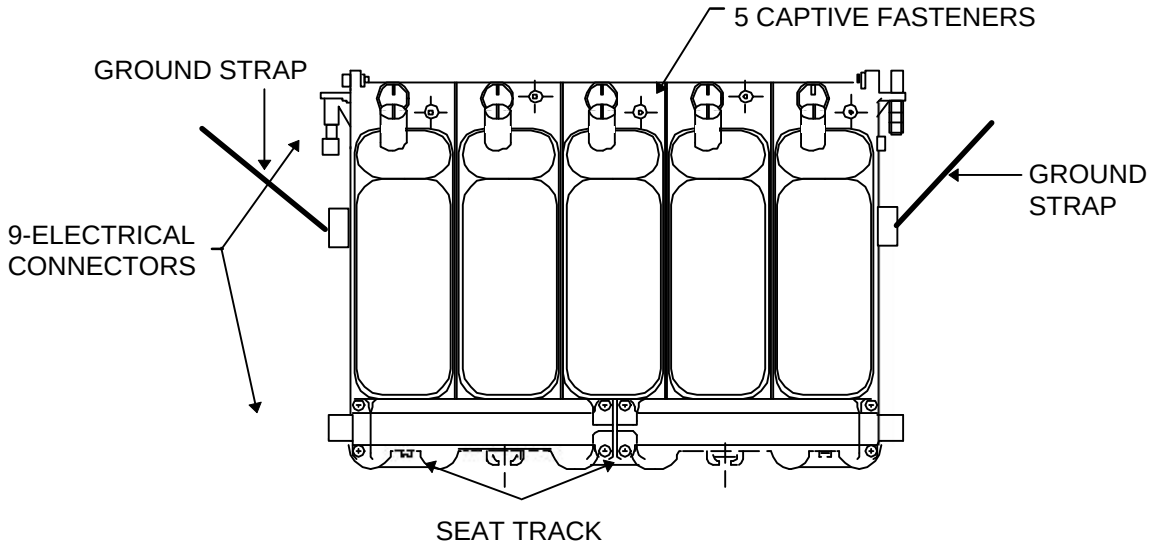


Figure 1.- CBM Controller Panel Assembly.

3. Label power/data cables with corresponding J receptacle numbers.

4. Demate power/data cable connectors (nine) from each Controller Panel Assembly (1,2,3,4). Tmpry restrain.

5. Place protective caps on all electrical connectors and receptacles.

6. Disconnect ground straps (two) from each Controller Panel Assembly (Ratchet 3/8” Drive, 5/32” Hex Head).

7. Loosen fasteners (five) on each Controller Assembly and detach from bulkhead. Label each controller with its location (overhead, deck, port, starboard) and position (1,2,3,4). Stow Controller Assembly in protective container (Ratchet 3/8” Drive, 7/16” Socket).

POST MAINTENANCE

8. Stow Controller Panel Assemblies (procedure tbd).

9. Stow tools, equipment.

CBM CONTROLLER ASSEMBLY INSTALL NODE 1 FWD

OBJECTIVE:
This procedure installs four CBM Controller Assemblies at the Fwd CBM port location within Node 1.

LOCATION:
Installed: Node 1 Active CBM Docking Ring
Stowed: TBD

DURATION:
1 hour

PARTS:
CBM Controller Assembly (P/N 683-13621-3) (Same as Allied Signal P/N 2355260-1)
CBM Controller Assembly Storage Container

MATERIALS:
None

TOOLS REQUIRED:
Equipment Bag
Scopemeter
Kit E:
    Ratchet 3/8" Drive
    4" Ext 3/8" Drive
Kit C:
    7/16" Socket, 3/8" Drive
Kit D:
    5/32" Hex Head, 3/8" Drive
Kit G:
    (30-200 in-lbs) Trq Wrench, 3/8" Drive
IVA Tool Box, Lid #1:
    Static Wrist Tether

REFERENCED PROCEDURE(S):
None

SAFE

WARNING
Failure to remove power can result in electrical shock hazard.

1. Verify Primary, Secondary RPCs supplying applicable CBM are Op.

PCS S&M

N1 Fwd CBM Display

'Controller Panel Assy Power/Data Status'

√RPCM N13B C RPC [X] Cntr Assy [Y]	[X] =	3	4	5	6
	[Y] =	1	2	3	4
√RPCM N14B A RPC [X] Cntr Assy [Y]	[X] =	2	3	14	15
	[Y] =	1	2	3	4

CAUTION

Equipment contains parts sensitive to damage by Electrostatic Discharge (ESD).

2. Don static wrist tether.
   Secure clip end to unpainted metal surface.

INSTALL

See Figure 1.

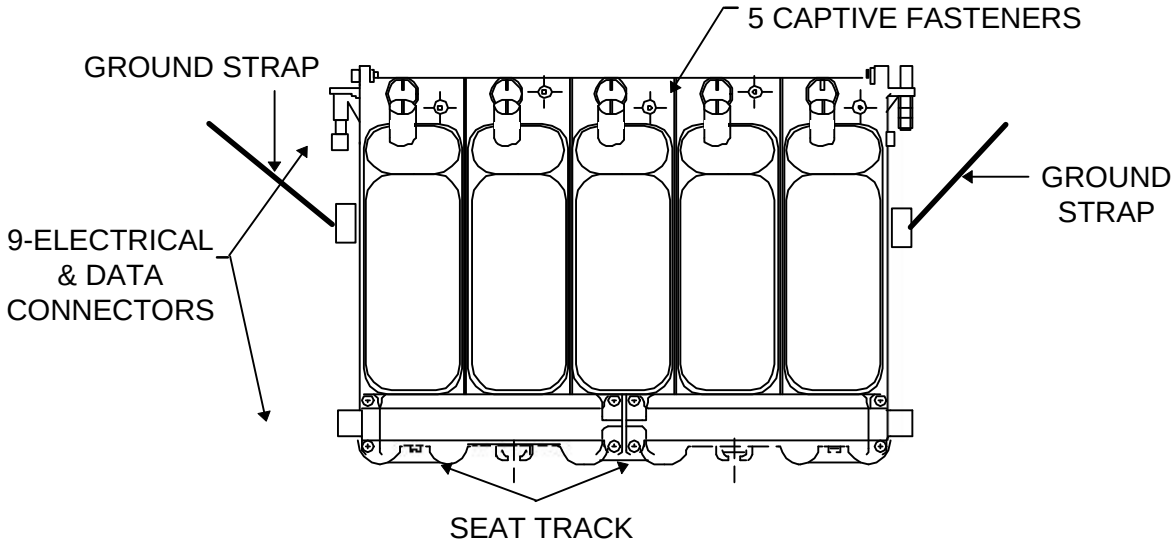


Figure 1.- CBM Controller Panel Assembly.

NOTE

Controller Assemblies were labeled when removed. Position 1 is Overhead.

3. Mount each Controller Assembly in its labeled position (1,2,3,4). Tighten fasteners (five per Assembly), torque to 100 ± 5 inch pounds (Ratchet 3/8" Drive, 7/16" Socket, (30-200 in-lbs) Trq Wrench).

4. Connect all Controller Assembly ground straps (two per Assembly) (Ratchet 3/8” Drive, 4” Ext, 5/32” Hex Head).

5. Check for continuity between casing of each Controller Assembly module (two per Assembly) and Node 1 structure (Scopemeter).

Table 1.- Node 1 Fwd CBM Controller Power/Data Cables

Cable	Plug No.	Receptacle No.	Harness No.
Controller Assy 1			
Capture Latch	P1	J5	TBD
Powered Bolt	P1	J6	TBD
Powered Bolt	P1	J7	TBD
Powered Bolt	P1	J8	TBD
Powered Bolt	P1	J9	TBD
Primary Power	P1	J1	W720
Secondary Power	P1	J3	W722
1553 Bus Data	P1	J2	W721
485 Bus Data	P1	J4	W723
Controller Assy 2			
Capture Latch	P1	J5	TBD
Powered Bolt	P1	J6	TBD
Powered Bolt	P1	J7	TBD
Powered Bolt	P1	J8	TBD
Powered Bolt	P1	J9	TBD
Primary Power	P2	J1	W720
Secondary Power	P2	J3	W722
1553 Bus Data	P2	J2	W721
485 Bus Data	P2	J4	W723
Controller Assy 3			
Capture Latch	P1	J5	TBD
Powered Bolt	P1	J6	TBD
Powered Bolt	P1	J7	TBD
Powered Bolt	P1	J8	TBD
Powered Bolt	P1	J9	TBD
Primary Power	P3	J1	W720
Secondary Power	P3	J3	W722
1553 Bus Data	P3	J2	W721
485 Bus Data	P3	J4	W723
Controller Assy 4			
Capture Latch	P1	J5	TBD
Powered Bolt	P1	J6	TBD
Powered Bolt	P1	J7	TBD
Powered Bolt	P1	J8	TBD
Powered Bolt	P1	J9	TBD
Primary Power	P4	J1	W720
Secondary Power	P4	J3	W722
1553 Bus Data	P4	J2	W721
485 Bus Data	P4	J4	W723

6. Mate all CBM controller power/data cables (nine per controller). See Table 1.

POST MAINTENANCE

7. Stow Controller Assembly storage containers, tools, equipment.

FGB EGRESS

TOOLS REQUIRED:
Flashlight Hatch Tool
APAS Hatch Tool
Common Screwdriver

1. DEACTIVATE NODE 1-FGB VENTILATION
   Node 1: ECLSS: Aft Port IMV Fan
   Nod1_ Aft_Port_IMV_Fan
   'Nod1_ Aft_ Port_IMV_Fan'

   sel Fan Commands
   cmd Off **Execute**
   √Stat - Off
   √Spd,rpm is decreasing

2. AIR DUCT #1 DISASSEMBLY

FGB
   1. TBD

3. AIR DUCT #2 DISASSEMBLY
   1. TBD

PMA 1
   2. Install cap to PMA 1 hard duct inlet.
      Secure flat band coupling with over-center latch.

   3. Remove cover on hard duct grille assembly.

4. PA-ICC HATCH BULKHEAD RING REMOVAL

PA-ICC Hatch
   1. Rotate hatch handle in direction of open (OTÊPÜITO) position.
      Unsecure bottom portion of protective ring alignment pin from socket on handle mechanism assembly.

   2. Rotate protective ring up to hatch and detach protective ring brackets from hatch hinge pin.

Panel 402
   3. Fold protective ring and secure to panel using two restraint straps.

5. ALARM CONTROL PANEL DEACTIVATION
   1. POWER → Off
      √■ FUSE (light off)

PA Port, ICC Panel 229

6. SECURE OCÏ-4 FIRE EXTINGUISHERS IN PA & ICC
   1. Install blue launch restraints bolts (four) from clamps (two) with Common Screwdriver (bolts and clamps stowed earlier).

ICC Port Panel 414 ÙÎ-ËÎ

7. ICC LIGHTING DEACTIVATION
   1. 1,2,3,4 Ë1 (switch) → Off (switch down)

Panel 430 ÙÎ-ËÎ

   2. 1,2,3,4 Ë1 (switch) → Off (switch down)

8. TAKE AIR SAMPLES OF FGB
   1. Collect air samples (two) from inside FGB using Air Sample Bottles.

9. CONFIGURE FOR FGB EGRESS

Orb MO10W

   1. 14.7 CAB REG INLET SYS 1,2 vlv (two) → Cl
   2. FGB: ECLSS

      FGB: ECLSS

      √FGB Dock Adptr PEV - Cl
      √Nod1 PEV - Cl

10. EGRESS FGB ICC

ICC

   1. √All equipment bags and returning items removed from FGB ICC.
   2. Close FGB PA-ICC Hatch
      Close Hatch.
      Rotate hatch handle in direction of CLOSE (ÇAÊPÜITÜ) position.

11. CONFIGURE FOR PA-IC HATCH LEAK CHECK

CRT

      X: SM 60 TABLE MAINT

   1. Record CABIN P: _____ psia (FGB ICC closeout press)
      (use paramid 0612405)
      ____- 0.4 psia (hatch delta = 20 mmHg)
   2. Desired pressure = (TBD) psia
   3. Record time and FGB ICC pressure:
      FGB : ECLSS
      MET: _____/____:____:____
      FGB Cab Press: _____ mmHg

12. FIRST PARTIAL DEPRESS

Orb AW82B

   1. AIRLK DEPRESS vlv cap → Vent, Remove

NOTE
Klaxon each time airlock depress valve is opened.

2. AIRLK DEPRESS vlv → 5

FGB : ECLSS

3. √FGB Cab Press not decreasing.

Orb AW82B
4. When CABIN P = desired pressure from step 11-2 (est. ~3 minute)
AIRLK DEPRESS vlv - CL

PA Port Ù Î -Ë Î
13. PA & ICC LIGHTING DEACTIVATION
1. 1,2,3,4-Ë1 (switch) → Off (switch down)

14. EGRESS FGB PA

PA
1. √All equipment bags and returning items removed from FGB PA.

2. Clean PMA1-PA hatch bulkhead seal with alcohol pads.

15. CLOSE FGB PMA1-PA HATCH**:**
1. Select 'ÐÀÁ Î ×ÅÅ' (WORKING) torque setting on hatch tool,
2. Insert tool in hatch socket,
3. Rotate 6-7 turns in direction of ' Î ÒÊÐ' (CLOSE) arrow until it clicks.

****
* If tool prematurely slips or does not engage: *
* Select 'ÀÂÀÐÉÉ Í Î Å' (EMERGENCY) setting *
* on hatch tool. *
* Reattempt to open Hatch. *
****

16. CONFIGURE FOR PMA1-PA HATCH LEAK CHECK

X: SM 60 TABLE MAINT

1. Record CABIN P: _____ psia (FGB PA closeout press)
(use paramid 0612405)
____- 0.4 psia (hatch delta = 20 mmHg)
2. Desired pressure = (TBD) psia

3. Record time and FGB PA pressure:
FGB: ECLSS
MET:_____/____:____:____
Docking Adapter Cab Press:_____ mmHg

17. SECOND PARTIAL DEPRESS

Orb AW82B
1. Start depress
AIRLK DEPRESS vlv → 5

FGB: ECLSS

2. √Docking Adapter Cab Press not decreasing

Orb
AW82B

3. Stop depress.
   When CABIN P = desired pressure from step 16-2 (est. ~3.5 minutes)
   AIRLK DEPRESS vlv → Cl
   Install AIRLK DEPRESS vlv cap

18 FGB HATCH LEAK CHECK

FGB: ECLSS

1. At MET 30 minutes past previous MET recorded in step 19, proceed
   Record Docking Adapter Cab Press: _____ mmHg
   Record FGB Cab Press: _____ mmHg
   MET: ____/___:___:___

****
* If FGB Cab Press or Docking Adapter Cab *
* Press ≤ (pressures recorded in step 12.3 and *
* 16.3 - TBD mmHg) *
* Notify **MCC-H**. *
****

2. Report results of leak check to **MCC-H**.

PMA 1 EGRESS

TOOLS AND EQUIPMENT REQUIRED
Flashlight

1. NODE 1 IMV AFT VALVE CONFIGURATION

Node 1 Aft
√Node 1 IMV Aft Port Valve - Open
Stow handle.

Node 1 IMV Aft Stbd Valve → Open
Stow handle.

2. PMA 1 EGRESS
√All equipment bags and returning items removed from PMA1

Node 1 Aft Hatch
Close Node 1 Aft Hatch per decal.

√MPEV - Close, Capped

NODE 1 EGRESS

TOOLS AND EQUIPMENT REQUIRED
Desiccant/Shroud Assemblies (four)
Flashlight
Batts (sixteen)

ENABLE PPRVs

Node 1 Port, Starboard Hatch

1. Remove PPRV caps (two).

Node 1 xx_xx

2. Stow caps in rack (TBD).

NODE 1 LIGHTING CHECKOUT

Node 1

3. Deactivate Node 1 lights at luminaries.
   NOD1 OS4 Int Light pb - Off
   NOD1 OS4 Int Light pb - On
   NOD1 OS2-1 Int Light pb - On
   NOD1 OS2-2 Int Light pb - Off
   NOD1 OS2-2 Int Light pb - On
   NOD1 SD2 Int Light pb - Off
   NOD1 SD2 Int Light pb - On
   NOD1 PD2 Int Light pb - Off
   NOD1 PD2 Int Light pb - On
   NOD1 OP4 Int Light pb - Off
   NOD1 OP4 Int Light pb - On
   NOD1 OP2-1 Int Light pb - On
   NOD1 OP2-2 Int Light pb - On

CONFIGURE FOR NODE 1 EGRESS

Node 1 xx_xx

4. Remove station portable fire extinguisher. Stow in bag.

5. Collect air samples (two) from inside Node 1 using Grab Sample Bottle.

6. Relocate QDMs and O2 hoses to orbiter.

7. LEH O2 7,8 vlv (two) $\rightarrow$ Cl

8. LEH O2 7,8 Outlet (two) $\rightarrow$ Remove ISS O2 Extension Segment to each Outlet, and reconnect QDM

9. LEH O2 7,8 vlv (two) $\rightarrow$ Op

10. Stow O2 hoses.

11. $\surd$All equipment bags and returning items removed from Node 1.

DESICCANT INSTALLATION AND PORTABLE FAN ACTIVATION

12. √Fan Pwr (four) - Off
    Replace Batts, if required.

13. Unstow Desiccant/Shroud Assemblies (four) from bag.

14. Attach Desiccant/Shroud Assemblies to each fan (four).

15. Fan Power (four) - High

16. √Fan RPM control position (four) - Full CW

17. √Fan is running.

MODULE EGRESS

Node 1 Fwd Hatch

18. √MPEV - Uncapped

PMA 2

19. Open grille cover on PMA 2 hard duct.

Node 1 Fwd

20. Node 1 Fwd Port, Stbd IMV Valve (two) → Close

NOTE
All Node1 lights will go off during this step.

Node1 Aft Endcone

21. NOD1 General Lighting pb - Off
    NOD1 General Lighting pb - On

Node 1 Fwd Hatch

22. Close Node 1 forward hatch per decal.

23. √MPEV - Close

REMOVE POWER FROM N1 LIGHTS

EPCS

24. Node 1: EPS: RPCM N13B A
    RPCM N13B A
    sel RPCM Detail

    sel RPC [X] [X] = 5 , 13
    √RPC [X] Open Cmd - Ena

    cmd Open **Execute**
    √Position - Op

    Repeat

Node 1: EPS: RPCM N13B B
RPCM N13B B

sel RPC 1
√Open Cmd - Ena
sel Commands
cmd Open **Execute**
√Position - Op

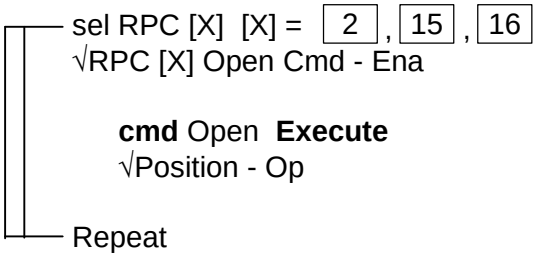
Node 1: EPS: RPCM N13B C
RPCM N13B C

sel RPC 1
√Open Cmd - Ena
sel Commands
cmd Open **Execute**
√Position - Op

Node 1: EPS: RPCM N14B B
RPCM N14B B

sel RPC 1
√Open Cmd - Ena
sel Commands
cmd Open **Execute**
√Position - Op

Node 1: EPS: RPCM N14B C
RPCM N14B C
sel RPCM Details



PMA 2 EGRESS

TOOLS AND EQUIPMENT REQUIRED

Ratchet Wrench
1/4” to 3/8” Adapter
3/8” to 1/4” Adapter
3/8” Universal Joint
TBD” Extension
Torque Wrench
7/16” Deepwell Socket
IMV Caps (two)

AIR DUCT REMOVAL/CONFIGURATION

PMA 2 Aft

1. Disconnect PMA/Node extension duct from starboard IMV flange.
   Tmpry stow V-band clamp.

2. Remove V-band assembly and flange saver with orifice from the port IMV flange.
   Stow flange saver with orifice in “Return to Houston” bag.

3. With combination ratchet and socket, install IMV caps (two) to starboard and port IMV flanges.
   Tighten V-band clamps 34 to 36 in-lbf (3.8 to 4.1 N-m).

MO13Q

4. ARLK/TNL FAN A(B) → Off

5. Disconnect shuttle/station air duct assembly from PMA 2 duct inlet.
   Tmpry stow V-band clamp.

6. Install cap to PMA 2 hard duct inlet.
   Secure flat band coupling with over-center latch.

Ext A/L

7. Disconnect shuttle/station air duct assembly from external A/L duct.

8. Stow shuttle/station air duct assembly in PMA 2.
   Secure assembly with TBD.

9. Connect external A/L duct to halo cross air duct.

MO13Q

10. ARLK/TNL FAN A(B) → On
    √Airflow at halo

11. Insert ODS air duct extension into vestibule.

12. √All equipment bags and returning items removed from PMA 2.

APAS HATCH CLOSURE

APAS Hatch

13. Egress PMA.
    Close APAS Hatch.
    Select 'ÐÀÁ Î ×ÅÅ' (WORKING) torque setting on hatch tool.
    Insert tool in hatch socket.
    Rotate tool 3-4 turns in direction of ' Î ÒÊÐ' (CLOSE) arrow until tool clicks.

    ****
    * If tool prematurely slips or does not engage: *
    * Select 'ÀÂÀÐÉÉ Í Î Å' (EMERGENCY) setting *
    * on hatch tool. *
    * Reattempt to open Hatch. *
    ****

14. √APAS EQUAL VLV - Op

ODS HATCH CLOSURE

15. Remove ODS air duct extension from vestibule.

ODS Hatch

16. Close ODS Hatch per decal.

17. √Equal vlv (two) - Off, capped

C&DH PROCEDURES

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CONFIG C&DH FOR ORBITER UNDOCKING WHILE N1- 2(1) PRIMARY

1. INHIBIT ORB BUS N1-2(1) AUTO SWITCHOVER

PCS2(1) Node 1: C&DH: MDM N1-2(1)

Primary NCS MDM Node 1

'MDM ID:'

sel UB Orb N1 2(1)
sel Bus Status

UB_Orb_Bus_Status

√N1_2(1)_MDM_UB_ORB_N1_2(1)_Ch_Sw_Inhib_
Stat - <blank> (ENA)

If X (INH) go to step 2

sel Bus Commands

N1_2(1)_MDM_UB_ORB_N1_2(1)

cmd Inhib_Auto_AB_Ch_Sw **Execute**

UB_Orb_Bus_Status

√N1_2(1)_MDM_UB_ORB_N1_2(1)_Ch_Sw_Inhib_Stat – X (INH)

2. INHIBIT RT FDIR

'MDM ID:'

sel UB Orb N1 2(1)
sel RT Status

UB_Orb_RT_Status

√RT FDIR Inhibited 8, 9, 24, 25 – <blank> (ENA)
If all checked RTs X (INH) >>

sel Inhib_FDIR_RT Commands

N1_2(1)_MDM_UB_ORB_N1_2(1)_Inhib_FDIR

cmd Inhib_FDIR_FGB_MDM_1 **Execute**
cmd Inhib_FDIR_FGB_MDM_2 **Execute**
cmd Inhib_FDIR_OIU_1 **Execute**
cmd Inhib_FDIR_OIU_2 **Execute**

N1_2(1)_MDM_UB_ORB_N1_2(1)_Inhib_FDIR

√RT FDIR Inhibited 8, 9, 24, 25 -- X (INH)

Inform **MCC-H** procedure is complete.

CONFIG C&DH AFTER ORBITER UNDOCKING WHILE N1-2(1) PRIMARY

1. ENABLE RT FDIR
   Node 1: C&DH: MDM N1-2(1)
   'MDM ID:'

   sel UB Orb N1 2(1)

   sel RT Status

   UB_Orb_RT_Status

   √RT FDIR Inhibited 8, 9, 24, 25 -- X (INH)

   If all checked RTs are blank (ENA) go to step 2

   sel Ena_FDIR_RT Commands

   N1_2(1)_MDM_UB_ORB_N1_2(1)_Ena_FDIR

   cmd Ena_FDIR_FGB_MDM_1 **Execute**
   cmd Ena_FDIR_FGB_MDM_2 **Execute**
   cmd Ena_FDIR_OIU_1 **Execute**
   cmd Ena_FDIR_OIU_2 **Execute**

   N1_2(1)_MDM_UB_ORB_N1_2(1)_Ena_FDIR

   √RT FDIR Inhibited 8, 9, 24, 25 -- <blank> (ENA)

2. ENABLE ORB BUS N1-2(1) AUTO SWITCHOVER
   Primary NCS MDM Node 1
   'MDM ID:'

   sel UB Orb N1 2(1)
   sel Bus Status

   UB_Orb_Bus_Status

   √N1_2(1)_MDM_UB_ORB_N1_2(1)_Ch_Sw_Inhib_
   Stat - <blank> (INH)

   If blank (ENA) >>

sel Bus Commands

N1_2(1)_MDM_UB_ORB_N1_2(1)

cmd Ena_Auto_AB_Ch_Sw **Execute**

UB_Orb_Bus_Status

√N1_2(1)_MDM_UB_ORB_N1_2(1)_Ch_Sw_Inhib_
Stat - <blank> (ENA)

NCS DATA LOAD PROCEDURE

1. VERIFY TIME CONSTRAINTS FOR DATA LOAD

NOTE
1. Determine if the Load requires a continuous uplink session or can be done with ZOEs.
2. Verify if the selected communications path supports performing the load in a reasonable amount of time for the MDM checksum safing response to be disabled.

2. LOG MDM CHECKSUMS
   sel Software Health
   record CSCI Version ID _____

3. SELECT LOAD IMAGE FILE TO UPLINK

DNAV Command Inventory: Data Load Preparation

Data Load Preparation

sel Select Load File
Navigate to the load image file you want to uplink.
If load image file is a PPL
√Version - <is correct version>

NOTE
The user must select the proper version of the load image file. There will be separate files for loads to DRAM and EEPROM. For PPLs there is only one file. For Adapation data there may be multiple files for a single update. For Software loads there may be only one large file.

√Destination Device (N1-1,N1-2, N1 Primary, N1 Secondary)

If load is to DRAM
√Memory Location - DRAM
If load is to EEPROM
√Memory Location - EEPROM

√Start Address
Should correspond to the address specified in the VDD.

√Word Count
Should correspond to the size specified in the VDD.

Optional:
√Metering Rate
Should be 1.00 for OIU cmd path, .67 for Early Comm.

Input Priority (None, High, Urgent, Critical)
Input Uplink after: (time to uplink data load after)
Input Uplink by: (time to perform uplink by)
Input Remarks: (Remarks to FMT Manager)

sel Submit to FMT

4. COORDINATION WITH THE FMT MANAGER

DVIS Call ODIN on the FMT DVIS loop to coordinate Uplink request.
ODIN will perform MDM configuration and uplink of data load.

5. VIEWING LOAD STATUS

CDDT Node 1: C&DH: Primary(Secondary) MDM
NODE 1: C&DH: MDM:Primary(Secondary)
√Frame Count - <Incrementing>
MDM is operational.

NOTE
Checksum errors may occur during the load process. Sel MDM BIT Status √BST A word # 24 - X √BST A word # 2 - X

DNAV Uplink Manager
Uplink FMT Manager
√FMT_Load_Status 100% complete.
Record Data Load Commands _____

6. MAKING DATA LOAD PERMANENT
Repeat this procedure if also loading to EEPROM.

NCS DATA DUMP PROCEDURE

1. VERIFY TIME CONSTRAINTS FOR A DATA DUMP

NOTE
Determine if the Dump requires a continuous uplink session or can be done with ZOEs. Verify if the selected communications path supports performing the dump in a reasonable amount of time.

2. BUILDING A DATA DUMP COMMAND
   If you want to select an already saved data dump command go to step 3.

DNAV Command Inventory: Data Dump Preparation
Data Dump Preparation

Input OpsName.
Required if you want to save the command in command inventory.
sel Source Device
Choose device from the list.

Optional
If you want to perform a dump of the NCS diagnostic buffer collection list buffer
sel Diagnostic Dump

Input Start Address.
Enter the starting address for the dump.
Iinput Word Count.
Enter the size of the data dump.

If the data dump is from DRAM
√Memory Type - DRAM
If the data dump is from EEPROM
√Memory Type - EEPROM

Optional
If you want to receive the data only once,
sel One-Shot Delivery

Optional
Input Priority (None, High, Urgent, Critical)
Input Uplink after: (time to uplink data load after)
Input Uplink by: (time to perform uplink by)
Input Remarks: (Remarks to FMT Manager)

Input Save Dump to File.
Select path/filename to save data dump to.

sel Select Dump File
Navigate to the directory you want to save the dump file to and select the filename.

sel Submit to FMT
Go to step 5.

3. SELECTING A USER BUILT DATA DUMP REQUEST

DNAV Command Inventory: Data Dump Command Inventory
Data Dump Command Inventory

Select the data dump command to uplink.
sel Uplink

4. COORDINATION WITH THE FMT MANAGER

DVIS Call ODIN on the FMT DVIS loop to coordinate the downlink request.
ODIN will perform the data dump.

5. VIEWING THE DUMP STATUS

CDDT Node 1: C&DH: Primary(Secondary) MDM
Node 1: C&DH: MDM:Primary(Secondary)
√Frame Count - <incrementing>
MDM is operational.
√Dump Pipe - <open>

DNAV Downlink Manager
Downlink FMT Manager
√FMT Dump Status 100% complete

REINITIALIZE NODE 1 MDMs

1. VERIFY MDM STATES AND MDM IDs

PCS2(1) Node 1: C&DH: MDM N1-2(1)
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-2(1)

PCS2(1) Node 1: C&DH: MDM N1-1(2)
SECONDARY NCS MDM Node 1

√Frame Count - <static>

PCS2(1) Node 1: C&DH: MDM N1-2(1)
PRIMARY NCS MDM Node 1
'Software Control'

sel Transmit Mode Code

Primary_NCS_Transmit_Mode_Code

sel Primary NCS Xmt Mode Code Commands
cmd Xmt_Stat_Word_Tmplt
enter Bus ID - 2
enter RT Address - 6(5) **Execute**

√Subsystem Flag Set - X (set)

If Subsystem Flag Bit is set, N1-1(2) MDM is in Diagnostic State and is ready to accept diagnostic commands.

If Reinitialize MDM from EEPROM, go to step 3.
If Reinitialize MDM from DRAM, go to step 2.

2. PERFORM MDM REINITIALIZATION FROM DRAM

PCS2(1) Node 1: C&DH: MDM N1-2(1)
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities
sel Commands

NOTE

1. Startup process will execute from the UAS currently loaded in DRAM.

2. No POST is performed.

cmd N1_1(2)_MDM_Re_Init_MDM_DRAM **Execute**

Wait 60 seconds for MDM to reinitialize.
Go to step 4.

3. PERFORM MDM REINITIALIZATION FROM EEPROM

PCS2(1) Node 1: C&DH: MDM N1-2(1)
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities
sel Commands

NOTE

1. Reinitialize MDM from EEPROM will cause the loss of all current information in the DRAM such as BST, current Bus, RT, and application configuration.

2. All UAS and default Configuration Tables will be loaded from EEPROM.

3. Normal POST will also be performed.

cmd N1_1(2)_MDM_Re_Init_MDM_EEPROM **Execute**

Wait 60 seconds for MDM to reinitialize.

4. VERIFY MDM STATE AFTER REINITIALIZATION

PCS2(1) Node 1: C&DH: MDM N1-1(2)
SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√STATE - Standby
√MDM ID - N1-1(2)

****
* If state is not Standby, *
* √**MCC** *
****

5. ENABLE NCS AUTO RETRY

PCS2(1) Node 1: C&DH: MDM N1-2(1)
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities
√Primary_NCS_Auto_Retry_Ena - <blank> (Inhibited)

If X (Enable) >>

sel Commands
cmd Primary_NCS_Ena_NCS_Retry **Execute**

√Primary_NCS_Auto_Retry_Ena - X (Enable)

EPCS DEACTIVATION

1. POWER DOWN PCS
   Close all display windows

   At the Taskbar on bottom of Display
   sel EXIT

   On 'Logout Confirmation' window
   sel OK

   When 'Type any key to continue' appears

   If Shuttle AFD

PCS	PCS 1,2 Thinkpad PWR switches → Off
Pwr Sply	PCS1 DC PWR SPLY PWR switch → Off (Lt Off) PCS2 DC PWR SPLY PWR switch → Off (Lt Off)
TBD	DC UTIL PWR → Off
PDIP	PDIP UTIL PWR → Off

   If ISS RS

PCS	PCS Thinkpad PWR switch → Off
TBD	RS Power switch → Off

2. DISCONNECT EPCS POWER AND DATA CABLE
   If Shuttle AFD

PDIP	Disconnect both Orb 1553 Data cables to (PDIP Data Ports 1,2) outlet 1553 PC Card Adapter Cable. Disconnect both 6 foot Orb DC PWR SPLY cable to DC UTIL PWR outlet DC PWR SPLY outlet (J1). Disconnect both 25 foot DC PWR SPLY cable to EPCS DC PWR outlet DC PWR SPLY outlet (J2).

   If ISS RS

TBD	Disconnect RS Power Cable. Disconnect 1553 Data/Power Cable to PCR outlet DC PWR SPLY outlet (J1) 1553 PC Card Adapter Cable.

3. STOW PCS

TBD

PCS - Two Thinkpads
Two 25 foot DC PWR cables
If Shuttle AFD
- Two 6 foot DC PWR SPLY cables
- Two ORB 1553 Data Cables
- US DC PWR SPLY

If ISS RS
- 1553 Data/Power Cable
- RS DC PWR SPLY

Node 1 MDM State Transitional Matrixes

	N1-2 Transition				
Initial N1-1 State	**Prim => Off, Diag**	**Prim => Stdby**	**Off/Diag => Prim**	**Stdby => Prim**	**Stdby => Diag/Off**
Primary	**1**	**1**	**B**	**B**	**D**
Secondary	**A**	**A**	**1**	**1**	**3**
Standby	**A**	**A**	**1**	**1**	**3**
Diag/Off	**2**	**3**	**C(TBD)**	**1**	**3**

	N1-1 Transition						
Init N1-2 State	**Prim => Sec**	**Prim =>Off/Diag**	**Prim => Stby**	**Sec => Off/Diag/Stby**	**Off/Diag => Prim**	**Off/Diag/Stby => Sec**	**Stby => Off/Diag**
Primary	**1**	**1**	**1**	**G**	**1**	**I**	**J**
Standby	**E**	**F**	**F**	**1**	**1**	**1**	**3**
Diag/Off	**3**	**2**	**3**	**1**	**H(TBD)**	**1**	**3**

ACTIONS

A = Transitioning N1-2 to Dgnstc/Stdby/Off from Prim & N1-1 to Prim from Stby/Sec
B = Transitioning N1-2 to Prim from Off/Dgnstc/Stby while N1-1 is Prim
C = Transitioning N1-2 to Prim from Off/Dgnstc while N1-1 is Off/Dgnstc
D = Transitioning N1-2 to Dgnstc from Stby while N1-1 is Prim
E = Transitioning N1-1 to Sec from Prim & N1-2 to Prim from Stby
F = Transitioning N1-1 to Off/Dgnstc/Stby from Prim & N1-2 to Prim from Stby
G = Transitioning N1-1 to Off/Dgnstc/Stby from Sec while N1-2 is Prim
H = Transitioning N1-1 to Prim from Off/Dgnstc while N1-2 is Off/Dgnstc
I = Transitioning N1-1 to Sec from Off/Dgnstc/Stby while N1-2 is Prim
J = Transitioning N1-1 to Off/Dgnstc from Stby while N1-2 is Prim

RESULTING STATES	
N1-1=Prim	**N1-2=Off/Dgnstc/Stby**
N1-1=Sec	**N1-2=Prim**
N1-1=Off/Dgnstc	**N1-2=Prim**
N1-1=Prim	**N1-2=Dgnstc**
N1-1=Sec	**N1-2=Prim**
N1-1=Off/Dgnstc/Stby	**N1-2=Prim**
N1-1=Off/Dgnstc/Stby	**N1-2=Prim**
N1-1=Prim	**N1-2=Off/Dgnstc**
N1-1=Sec	**N1-2=Prim**
N1-1=Off/Dgnstc	**N1-2=Prim**

Notes:
1 = Illegal States
2 = Operationally Feasible, but will lose both boxes at 2 A.
3 = Unstable States. Feasible, but will automatically go back to the original configuration.

A. TRANSITIONING N1-2 TO DIAGNOSTIC/STANDBY/OFF FROM PRIMARY & N1-1 TO PRIMARY FROM SECONDARY/STANDBY

1. VERIFY MDM STATES AND MDM IDs

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-2

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√STATE - Secondary/Standby
√MDM ID - N1-1

NOTE
If states are not correct, do not execute this procedure.

√**MCC**

2. DISABLE NCS AUTO RETRY

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1
'Software Control'

sel MDM Utilities

SECONDARY NCS MDM Node 1

√Secondary_NCS_Auto_Retry_Inh - X (Inhibited)

If blank (enabled)
sel Commands
cmd Secondary_NCS_Inh_NCS_Retry **Execute**
√Secondary_NCS_Auto_Retry_Inh - X (Inhibited)

3. COMMAND N1-2 MDM TO DIAG (N1-1 SHOULD GO TO PRIM)

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM FDIR
√Prim_NCS_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

If X (Inhibited)
'MDM Major State'

sel Commands
cmd N1-2_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute**

'Software Control'

sel MDM FDIR
√Prim_NCS_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

NOTE

1. Sending the following command will cause the loss of PCS2, Early COMM, and OIU telemetry until OIU reconfiguration and PCS1 reconnection are done.

2. Possible PDI DECOM Fail message.

'MDM Major State:'

sel Commands
cmd N1-2_MDM_Xsitn_Dgnstc_State **Execute**

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√Frame Count - <static> (Loss of PCS2 telemetry)

Wait 1 minute for N1-1 to go to Primary. N1-1 should go to Primary State after 50 seconds.

4. RECOVER TELEMETRY ON PCS1 AND VERIFY N1-1 IS PRIMARY

PCS1 After boot up (as required), task-bar appears at bottom of display
sel Arrow directly above 'PCS' logo
sel Start/Restart PCS CDS
sel Icon to open PCS CDS Main Control Panel Window

√Status Box is Green and 'Connected' is displayed in the PCS CDS Main Control Panel Window.

NOTE

PCS1 connection to MDM is indicated by 'Green' in the Status Box and/or 'Connected' message displayed in the PCS1 CDS Main Control.

```
**********************************************************************
*  If Status Box is not Green, select 'Connect to MDM' icon          *
*  to reconnect.                                                     *
*  If still no joy, close all displays and all iconified items and   *
*  repeat this step.                                                 *
*                                                                    *
*  √MCC if Status Box is still not green.                            *
**********************************************************************
```

NOTE
C&W tone and TBD C&W message will be generated as N1-1 becomes primary and detects N1-2 fails.

PCS1

Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM ID - N1-1
√MDM State - Primary

5. TELEMETRY RECOVERY ON EARLY COMM (GROUND ONLY)

NOTE
Early COMM should reconnect to N1-1 MDM on the other Orb bus automatically in about 10 seconds after N1-1 MDM becomes Primary.

Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM ID - N1-1
√MDM State - Primary

```
**********************************************************************
*  If Frame Count is Static after 20 seconds from the moment         *
*  N1-1 becomes Primary (No Early COMM telemetry received),          *
*                                                                    *
*  √MCC                                                              *
**********************************************************************
```

6. TELEMETRY RECOVERY ON OIU

NOTE
Possible PDI DECOM Fail message.

CRT SM 212 OIU
BUS 4 BC - ITEM 15 EXEC
BUS 3 RT - ITEM 10 EXEC
Change OIU N1 Physical Device to N1-1 - ITEM 18 +4 EXEC

CRT Reload OIU FORMAT 2 - ITEM 1 +2 EXEC

CRT SM 210 NODE
√PHY ID PRI MDM - N1-1
√STATE - PRI
√FAIL - <blank>
√FRM CTR - <incrementing>

7. VERIFY N1-2 IS IN DIAGNOSTIC

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

√Frame Count - <static>

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1
'Software Control'

sel Transmit Mode Code

Primary_NCS_Transmit_Mode_Code

sel Primary NCS Xmt Mode Code Commands
cmd Xmt_Stat_Word_Tmplt
enter Bus ID - 2
enter RT Address - 5 **Execute**

√Subsystem Flag Set - X (set)

If Subsystem Flag Bit is set, N1-2 MDM is in Diagnostic State and is ready to accept diagnostic commands.

If transitioning N1-2 to Diagnostic >>
If transitioning N1-2 to Standby, go to step 8.
If powering off N1-2, go to step 9.

8. IF TRANSITIONING N1-2 MDM TO STANDBY STATE

PCS1 Node 1: C&DH: MDM N1-1

PRIMARY NCS MDM Node1

'Software Control'

sel MDM Utilities
sel Commands

NOTE
1. Startup process will execute from the UAS currently loaded in DRAM.
2. No POST is performed.

cmd N1_2_MDM_Re_Init_MDM_DRAM **Execute**

Wait 60 seconds for MDM to reinitialize.

PCS1 Node 1: C&DH: MDM N1-2

SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√STATE - Standby
√MDM ID - N1-2

****
* If state is not Standby, *
* *
* √**MCC** *
****

9. IF POWERING OFF N1-2 MDM

PCS1 Node 1: C&DH: MDM N1-2

SECONDARY NCS MDM Node 1

'RPCM _N1RS2_C'

sel RPC 13 (Nod1_2_MDM)

RPCM _N1RS2_C_RPC_13 Detail

sel Commands
cmd Open **Execute**
√Position - Op

B. TRANSITIONING N1-2 TO PRIMARY FROM OFF/DIAGNOSTIC/STANDBY WHILE N1-1 IS PRIMARY

1. VERIFY MDM STATES

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-1

If N1-2 is Off, go to step 2.
If N1-2 is in Diagnostic state, go to step 3.
If N1-2 is in Standby state, go to step 5.

2. IF N1-2 IS INITIALLY OFF, BRING IT TO STANDBY

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

'RPCM_N1RS2_C'

sel RPC 13 (Nod1_2_MDM)

RPCM_N1RS2_C_RPC_13 Detail

√Position - Op
sel Commands
cmd Close **Execute**
√Position - Cl

Wait at least 90 seconds for MDM to start up, finish POST, and go to Standby State.

Go to step 4.

3. IF N1-2 IS INITIALLY IN DIAGNOSTIC STATE, BRING IT TO STANDBY

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

√Frame Count - <static>

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1
'Software Control'

sel Transmit Mode Code

Primary_NCS_Transmit_Mode_Code

sel Primary NCS Xmt Mode Code Commands
cmd Xmt_Stat_Word_Tmplt
enter Bus ID - 2
enter RT Address - 5 **Execute**

√Subsystem Flag Set - X (set)

If Subsystem Flag Bit is set, N1-2 MDM is in Diagnostic State and is ready to accept diagnostic commands.

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities
sel Commands

NOTE

1. Check with **MCC** for which command to send (reinit from DRAM or EEPROM).
2. For DRAM Reinitialization
   Startup process will execute from the UAS currently loaded in DRAM.
   No POST is performed.
3. For EEPROM Reinitialization
   Reinitialize MDM from EEPROM will cause the loss of all current information in the DRAM such as BST, current Bus, RT, and application configuration.
   All UAS and default Configuration Tables will be loaded from EEPROM.
   Normal POST will be performed.

If reinitialize from DRAM
cmd N1_2_MDM_Re_Init_MDM_DRAM **Execute**
If reinitialize from EEPROM
cmd N1_2_MDM_Re_Init_MDM_EEPROM **Execute**

Wait 60 seconds for MDM to reinitialize.

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√STATE - Standby
√MDM ID - N1-2

****
* If state is not Standby, *
* *
* √**MCC** *
****

4. VERIFY N1-2 IS IN STANDBY STATE

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM State - Standby
√MDM ID - N1-2

5. COMMAND N1-1 TO SECONDARY, (N1-2 SHOULD GO TO PRIMARY)

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1

NOTE
1. Sending the following command will cause the loss of PCS1, Early COMM, and OIU telemetry until OIU reconfiguration and PCS2 reconnection are done.

2. Possible PDI DECOM Fail message.

'MDM Major State:'

sel Commands
cmd N1-1_MDM_Xsitn_Second_State **Execute**
√Frame Count - <static> (Loss of PCS1 telemetry)

N1-2 should go to Primary in 20 seconds.

6. TELEMETRY RECOVERY ON PCS2

PCS2 After boot up when task-bar appears at bottom of display
sel Arrow directly above 'PCS' logo
sel Start/Restart PCS CDS
sel Icon to open PCSCDS Main Control Panel Window

√Status Box is Green and 'Connected' is displayed in the PCS CDS Main Control Panel Window

NOTE
PCS connection to MDM is indicated by 'Green' in the Status Box and/or 'Connected' message displayed in the PCS CDS Main Control Panel Window.

```
**********************************************************************
*  If Status Box is not Green, select 'Connect to MDM' icon          *
*  to reconnect.                                                     *
*  If still no joy, close all displays and all iconified items and   *
*  repeat this step.                                                 *
*                                                                    *
*  √MCC if Status Box is still not green.                            *
**********************************************************************
```

7. VERIFY N1-2 IS PRIMARY AND N1-1 IS SECONDARY

PCS2 Node 1: C&DH: MDM N1-2

PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM ID - N1-2
√MDM State - Primary

PCS2 Node 1: C&DH: MDM N1-1

SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM ID - N1-1
√MDM State - Secondary

```
**************************************************
*  If States are not correct or no N1-2 TLM      *
*                                                *
*  √MCC                                          *
**************************************************
```

8. TELEMETRY RECOVERY ON EARLY COMM (GROUND ONLY)

NOTE

Early COMM should reconnect to N1-2 MDM on the other Orb bus automatically in about 10 seconds after N1-2 MDM becomes Primary.

Node 1: C&DH: MDM N1-2

PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM ID - N1-2
√MDM State - Primary

****
* If Frame Count is Static after 20 seconds from the moment *
* N1-2 becomes Primary (no Early COMM telemetry received), *
* *
* √**MCC** *
****

9. TELEMETRY RECOVERY ON OIU

NOTE
Possible PDI DECOM Fail message.

CRT SM 212 OIU
BUS 3 BC - ITEM 11 EXEC
BUS 4 RT - ITEM 14 EXEC
Change OIU N1 Physical Device to N1-2 - ITEM 18 +3 EXEC

CRT Reload OIU FORMAT 2 - ITEM 1 +2 EXEC

CRT SM 210 NODE
√PHY ID PRI MDM - N1-2
√STATE - PRI
√FAIL - <blank>
√FRM CTR - <incrementing>

D. TRANSITIONING N1-2 TO DIAGNOSTIC/OFF FROM STANDBY WHILE N1-1 IS PRIMARY

1. VERIFY MDM STATES AND MDM IDs

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-1

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

√STATE - Standby
√MDM ID - N1-2

NOTE
If states are not correct, do not execute this procedure.

√**MCC**

2. DISABLE NCS AUTO RETRY

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities

Primary_NCS_MDM_Utilities

√Primary_NCS_Auto_Retry_Inh - X (Inhibited)

If blank (Enable)
sel Commands
cmd Prim_NCS_Inh_NCS_Retry **Execute**
√Primary_NCS_Auto_Retry_Inh - X (Inhibited)

3. COMMAND N1-2 TO DIAGNOSTIC

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1
'Software Control'

sel MDM FDIR
√Second_NCS_Cmd_Xsitn_to_Dgnstc_Inh - blank (Enable)

If X (Inhibited)
'MDM Major State'

sel Commands
cmd N1-2_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute**

'Software Control'

sel MDM FDIR
√Second_NCS_Cmd_Xsitn_to_Dgnstc_Inh - blank (Enable)

'MDM Major State:'

sel Commands
cmd N1-2_MDM_Xsitn_Dgnstc_State **Execute**

4. VERIFY N1-2 IS IN DIAGNOSTIC

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

√Frame Count - <static>

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1
'Software Control'

sel Transmit Mode Code

Primary_NCS_Transmit_Mode_Code

sel Primary NCS Xmt Mode Code Commands
cmd Xmt_Stat_Word_Tmplt
enter Bus ID - 2
enter RT Address - 5 **Execute**

√Subsystem Flag Set - X (Set)

If Subsystem Flag Bit is set, N1-2 MDM is in Diagnostic State and is ready to accept diagnostic commands.

If transitioning N1-2 to Diagnostic >>
If powering off N1-2, go to step 5.

5. POWERING OFF N1-2 MDM

PCS1 Node 1: C&DH: MDM N1-2

SECONDARY NCS MDM Node 1

'RPCM _N1RS2_C'

sel RPC 13 (Nod1_2_MDM)

RPCM _N1RS2_C_RPC_13 Detail

sel Commands
cmd Open **Execute**
√Position - Op

E. TRANSITIONING N1-1 TO SECONDARY FROM PRIMARY & N1-2 TO PRIMARY FROM STANDBY

1. VERIFY MDM STATES AND MDM IDs

PCS1 Node 1: C&DH: MDM N1-1

PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-1

PCS1 Node 1: C&DH: MDM N1-2

SECONDARY NCS MDM Node 1

√STATE - Standby
√MDM ID - N1-2

NOTE

If states are not correct, do not execute this procedure.

√**MCC**

2. COMMAND N1-1 TO SECONDARY, (N1-2 SHOULD GO TO PRIMARY)

PCS1 Node 1: C&DH: MDM N1-1

PRIMARY NCS MDM Node 1

NOTE

1. Sending the following command will cause the loss of PCS1, Early COMM, and OIU telemetry until OIU reconfiguration and PCS2 reconnection are done.

2. Possible PDI DECOM Fail message.

'MDM Major State:'

sel Commands
cmd N1-1_MDM_Xsitn_Second_State **Execute**

√Frame Count - <static> (Loss of PCS1 telemetry)

N1-2 should go to Primary in 20 seconds.

3. TELEMETRY RECOVERY ON PCS2

PCS2 After boot up, when task-bar appears at bottom of display
sel Arrow directly above 'PCS' logo
sel Start/Restart PCS CDS
sel Icon to open PCS CDS Main Control Panel Window

√Status Box is Green and 'Connected' is displayed in the PCSCDS Main Control Panel Window

NOTE
PCS2 connection to MDM is indicated by 'Green' in the Status Box and/or 'Connected' message displayed in the PCS2 CDS Main Control.

```
**********************************************************************
*  If Status Box is not Green, select 'Connect to MDM' icon          *
*  to reconnect.                                                     *
*  If still no joy, close all displays and all iconified items and   *
*  repeat this step.                                                 *
*                                                                    *
*  √MCC if Status Box is still not green.                            *
**********************************************************************
```

4. VERIFY N1-2 IS PRIMARY AND N1-1 IS SECONDARY

PCS2 Node 1: C&DH: MDM N1-2

PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√STATE - Primary
√MDM ID - N1-2

PCS2 Node 1: C&DH: MDM N1-1

SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√STATE - Secondary
√MDM ID - N1-1

```
************************************************
*  If States are not correct or no N1-2 TLM,   *
*                                              *
*  √MCC                                        *
************************************************
```

5. TELEMETRY RECOVERY ON EARLY COMM (GROUND ONLY)

NOTE
Early COMM should reconnect to N1-2 MDM on the other Orb bus automatically in about 10 seconds after N1-2 MDM becomes Primary.

Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM ID - N1-2
√MDM State - Primary

****
* If Frame Count is Static after 20 seconds from the moment *
* N1-2 becomes Primary (No Early COMM telemetry received), *
* *
* √**MCC** *
****

6. TELEMETRY RECOVERY ON OIU

NOTE
Possible PDI DECOM Fail message.

CRT SM 212 OIU
BUS 3 BC - ITEM 11 EXEC
BUS 4 RT - ITEM 14 EXEC
Change OIU N1 Physical Device to N1-2 - ITEM 18 +3 EXEC

CRT Reload OIU FORMAT 2 - ITEM 1 +2 EXEC

CRT SM 210 NODE
√PHY ID PRI MDM - N1-2
√STATE - PRI
√FAIL - <blank>
√FRM CTR - <incrementing>

F. TRANSITIONING N1-1 TO OFF/DIAGNOSTIC/STANDBY FROM PRIMARY & N1-2 TO PRIMARY FROM STANDBY

1. VERIFY MDM STATES

PCS1 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-1

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1

√STATE - Standby
√MDM ID - N1-2

NOTE
If states are not correct, do not execute this procedure.

√**MCC**

2. DISABLE NCS AUTO RETRY

PCS1 Node 1: C&DH: MDM N1-2
SECONDARY NCS MDM Node 1
'Software Control'

sel MDM Utilities

Primary_NCS_MDM_Utilities

√Secondary_NCS_Auto_Retry_Inh - X (Inhibited)

If blank (Enable)
sel Commands
cmd Second_NCS_Inh_NCS_Retry **Execute**
√Secondary_NCS_Auto_Retry_Inh - X (Inhibited)

3. COMMAND N1-1 TO DIAGNOSTIC

PCS1 Node 1: C&DH: MDM N1-1
Primary_NCS_MDM_Utilities
'Software Control'

sel MDM FDIR
√Prim_NCS_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

If X (Inhibited)
'MDM Major State'

sel Commands
cmd N1-1_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute**
sel MDM FDIR
√Prim_NCS_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

NOTE

1. Sending the following command will cause the loss of PCS1, Early COMM, and OIU telemetry until OIU reconfiguration and PCS2 reconnection are done.

2. Possible PDI DECOM Fail message.

'MDM Major State:'

sel Commands
cmd N1-1_MDM_Xsitn_Dgnstc_State **Execute**
√Frame Count - <static> (Loss of PCS telemetry)

N1-2 should go to Primary State after 20 seconds.

4. TELEMETRY RECOVERY ON PCS2

PCS2 After boot up, when task-bar appears at bottom of display
sel Arrow directly above 'PCS' logo
sel Start/Restart PCS CDS
sel Icon to open PCS CDS Main Control Panel Window

√Status Box is Green and 'Connected' is displayed in the PCS2 CDS Main Control Panel Window

NOTE

PCS2 connection to MDM is indicated by 'Green' in the Status Box and/or 'Connected' message displayed in the PCS2 CDS Main Control Panel Window.

```
**********************************************************************
*  If Status Box is not Green, select 'Connect to MDM' icon          *
*  to reconnect.                                                     *
*  If still no joy, close all displays and all iconified items and   *
*  repeat this step.                                                 *
*                                                                    *
*  √MCC if Status Box is still not green.                            *
**********************************************************************
```

5. TELEMETRY RECOVERY ON EARLY COMM (GROUND ONLY)

NOTE
Early COMM should reconnect to N1-2 MDM on the other Orb bus automatically in about 10 seconds after N1-2 MDM becomes Primary.

Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM ID - N1-2
√MDM State - Primary

****
* If Frame Count is Static after 20 seconds from the moment *
* N1-2 becomes Primary (No Early COMM telemetry received), *
*
* √**MCC** *
****

6. TELEMETRY RECOVERY ON OIU

NOTE
Possible PDI DECOM Fail message.

CRT SM 212 OIU
BUS 3 BC - ITEM 11 EXEC
BUS 4 RT - ITEM 14 EXEC
Change OIU N1 Physical Device to N1-2 - ITEM 18 +3 EXEC

CRT Reload OIU FORMAT 2 - ITEM 1 +2 EXEC

CRT SM 210 NODE
√PHY ID PRI MDM - N1-2
√STATE - PRI
√FAIL - <blank>
√FRM CTR - <incrementing>

7. VERIFY N1-2 IS PRIAMRY AND N1-1 IS IN DIAGNOSTIC

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√Frame Count - <static>

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√STATE - Primary
√MDM ID - N1-2

sel Transmit Mode Code

Primary_NCS_Transmit_Mode_Code

sel 'Primary NCS Xmt Mode Code Commands'
cmd Xmt_Stat_Word_Tmplt
enter Bus ID - 2
enter RT Address - 6 **Execute**

√Subsystem Flag Set - X (Set)

If Subsystem Flag Bit is set, N1-1 MDM is in Diagnostic State and is ready to accept diagnostic commands.

If transitioning N1-1 to Diagnostic >>
If powering off N1-1, go to step 8.
If transitioning N1-1 to Standby, go to step 9.

8. POWERING OFF N1-1 MDM

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

'RPCM _N1RS1_A'

sel RPC 11 (Nod1_1_MDM)

RPCM _N1RS2_A_RPC_11 Detail

√Position - Cl
sel Commands
cmd Open **Execute**
√Position - Op

If powering N1-1 off >>

9. TRANSITIONING N1-1 TO STANDBY STATE

PCS2 Node 1: C&DH: MDM N1-2

PRIMARY NCS MDM Node 1

'Software Control'

sel MDM Utilities
sel Commands

NOTE
1. Startup process will execute from the UAS currently loaded in DRAM.
2. No POST is performed.

cmd N1_1_MDM_Re_Init_MDM_DRAM **Execute**

Wait 60 seconds for MDM to reinitialize.

PCS2 Node 1: C&DH: MDM N1-1

SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√STATE - Standby
√MDM ID - N1-1

****
* If state is not Standby, *
* *
* √**MCC** *
****

G. TRANSITIONING N1-1 TO OFF/DIAGNOSTIC/STANDBY FROM SECONDARY WHILE N1-2 IS PRIMARY

1. VERIFY MDM STATES

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-2

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√STATE - Secondary
√MDM ID - N1-1

NOTE
If states are not correct, do not execute this procedure.

√**MCC**

If transitioning N1-1 to standby, go to step 2.
If transitioning N1-1 to Diagnostic or Powering N1-1 off, go to step 3.

2. TRANSITIONING TO STANDBY STATE

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1
'MDM Major State:'

sel Commands
cmd Second_NCS_Xsitn_Stby_State **Execute**
√N1-1 MDM State - Standby

If transitioning N1-1 to Standby >>

3. DISABLE NCS AUTO RETRY

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities

Primary_NCS_MDM_Utilities

√Primary_NCS_Auto_Retry_Inh - X (Inhibited)

If blank (Enable)
sel Commands
cmd Primary_NCS_Inh_NCS_Retry **Execute**
√Primary_NCS_Auto_Retry_Inh - X (Inhibited)

4. TRANSITIONING N1-1 TO DIAGNOSTIC

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1
'Software Control'

sel MDM FDIR
√Second_MDM_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

If X (Inhibited)
'MDM Major State:'

sel Commands
cmd N1-1_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute**

'Software Control'

sel MDM FDIR
√Second_MDM_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

'MDM Major State:'

sel Commands
cmd N1-1_MDM_Xsitn_Dgnstc_State **Execute**

If transitioning N1-1 to Diagnostic >>
If powering N1-1 off, go to step 5.

5. POWERING OFF N1-1 MDM

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

'RPCM _N1RS1_A'

sel RPC 11 (Nod1_1_MDM)

RPCM _N1RS1_A_RPC_11 Detail

√Position - Cl
sel Commands
cmd Open **Execute**
√Position - Op

I. TRANSITIONING N1-1 TO SECONDARY FROM OFF/DIAGNOSTIC/ STANDBY WHILE N1-2 IS PRIMARY

1. VERIFY MDM STATE

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-2

If N1-1 is Off, go to step 2.
If N1-1 is in Diagnostic state, go to step 3.
If N1-1 is in Standby state, go to step 5.

2. IF N1-1 IS INITIALLY OFF, BRING IT TO STANDBY

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1
'RPCM _N1RS1_A'

sel RPC 11 (Nod1_1_MDM)

RPCM _N1RS1_A_RPC_11 Detail

√Position - Op
sel Commands
cmd Close **Execute**
√Position - Cl

Wait at least 90 seconds for MDM to start up, finish POST, and go to Standby.

Go to step 4.

3. IF N1-1 IS INITIALLY IN DIAGNOSTIC STATE, BRING IT TO STANDBY

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√Frame Count - <static>

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1
'Software Control'

sel Transmit Mode Code

Primary_NCS_Transmit_Mode_Code

sel Primary NCS Xmt Mode Code Commands
cmd Xmt_Stat_Word_Tmplt
enter Bus ID - 2
enter RT Address - 6 **Execute**

√Subsystem Flag Set - X (set)

If Subsystem Flag Bit is set, N1-2 MDM is in Diagnostic State and is ready to accept diagnostic commands.

PCS2 Node 1: C&DH: MDM N1-1
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities
sel Commands

NOTE

1. Check with **MCC** for which command to send (reinit from DRAM or EEPROM).

2. For DRAM Reinitialization
   Startup process will execute from the UAS currently loaded in DRAM.
   No POST is performed.

3. For EEPROM Reinitialization
   Reinitialize MDM from EEPROM will cause the loss of all current information in the DRAM such as BST, current Bus, RT, and application configuration.
   All UAS and default Configuration Tables will be loaded from EEPROM.
   Normal POST will be performed.

If reinitialize from DRAM
cmd N1_1_MDM_Re_Init_MDM_DRAM **Execute**
If reinitialize from EEPROM
cmd N1_1_MDM_Re_Init_MDM_EEPROM **Execute**

Wait 60 seconds for MDM to reinitialize.

4. VERIFY N1-1 IS IN STANDBY STATE

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√N1-1 MDM State - Standby
√MDM ID - N1-1

****
* If state is not Standby, *
* *
* √**MCC** *
****

5. COMMAND N1-1 TO SECONDARY

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1
'MDM Major State:'

sel Commands
cmd N1-1_MDM_Xsitn_Second_State **Execute**

6. VERIFY N1-1 IS SECONDARY

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√Frame Count - <incrementing>

'MDM Major State:'

√MDM State - Secondary
√MDM ID - N1-1

****
* If state is not correct, *
* *
* √**MCC** *
****

J. TRANSITIONING N1-1 TO OFF/DIAGNOSTIC FROM STANDBY WHILE N1-2 IS PRIMARY

1. VERIFY MDM STATES

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

√STATE - Primary
√MDM ID - N1-2

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√STATE - Standby
√MDM ID - N1-1

NOTE
If states are not correct, do not execute this procedure.

√**MCC**

2. DISABLE NCS AUTO RETRY

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1
'Software Control'

sel MDM Utilities

Primary_NCS_MDM_Utilities

√Primary_NCS_Auto_Retry_Inh - X (Inhibited)
If blank (Enable)
sel Commands
cmd Primary_NCS_Inh_NCS_Retry **Execute**
√Primary_NCS_Auto_Retry_Inh - X (Inhibited)

3. COMMAND N1-1 TO DIAGNOSTIC

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1
'Software Control'

sel MDM FDIR
√Second_NCS_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

If X (inhibited)
'MDM Major State:'

sel Commands
cmd N1-1_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute**

'Software Control'

sel MDM FDIR
√Second_NCS_Cmd_Xsitn_to_Dgnstc_Inh - <blank> (Enable)

'MDM Major State:'

sel Commands
cmd N1-1_MDM_Xsitn_Dgnstc_State **Execute**

4. VERIFY N1-1 IS IN DIAGNOSTIC

PCS2 Node 1: C&DH: MDM N1-1
SECONDARY NCS MDM Node 1

√Frame Count - <static>

PCS2 Node 1: C&DH: MDM N1-2
PRIMARY NCS MDM Node 1

sel Transmit Mode Code

Primary_NCS_Transmit_Mode_Code

sel Primary NCS Xmt Mode Code Commands
cmd Xmt_Stat_Word_Tmplt
enter Bus ID - 2
enter RT Address - 6 **Execute**

√Subsystem Flag Set - X (Set)

If Subsystem Flag Bit is set, N1-2 MDM is in Diagnostic State and is ready to accept diagnostic commands.

If transitioning N1-1 to Diagnostic >>
If powering N1-1 off, go to step 5.

5. POWERING OFF N1-1 MDM

PCS1 Node 1: C&DH: MDM N1-1

SECONDARY NCS MDM Node 1

'RPCM _N1RS1_A'

sel RPC 11 (Nod1_1_MDM)

RPCM _N1RS1_A_RPC_11 Detail

sel Commands
cmd Open **Execute**

√Position - Op

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C&T PROCEDURES

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C&T

EARLY COMM DES KEY CHANGE

NOTE
FD approval has been obtained

KEY CHANGE PREPARATION

1. Inform GC of upcoming Early Comm Decryption key change.

2. Inform FCT that commanding is not available until key change is complete.

UPLINKING NEW DECRYPTION KEY

3. Obtain new DES key number from command.

   nav Early Comm
   Early S-Band Comm Management
   'System Configuration'

4. sel Key Sel
   cmd Decryption_Key_XXXX **Execute**

   √Decryption_Key - XXXX
   sel Decryption

5. GC configures ground equipment with new DES key, XXXX.

VERIFY COMMAND PATH AFTER KEY CHANGE

   nav Early Comm
   Early S-Band Comm Management
   'Antenna Command Display'

6. sel Port Array
   cmd Port Array Beam Sel 63 **Execute**

   √Beam Number - 63

7. Inform FCT that key change is complete.

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ECLSS PROCEDURES

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FGB HARMFUL CONTAMINANT CARTRIDGE REPLACEMENT

TOOLS REQUIRED;
Common Screwdriver
Trash Bag

PANEL REMOVAL

Panel 411

1. Remove blue launch restraint bolts (6 --- 8 bolts depending on panel) from Closeout Panels using Common Screwdriver.
   Dispose of launch restraints bolts in Trash Bag.

2. Remove standard panel TBD fasteners with TBD tool and open panel.

3. Verify fan is off.

> NOTE
> No onboard telemetry exists for system performance. Fan is verified deactivated by either checking for absence of air flow upon opening of Closeout Panel or aural cue.

CARTRIDGE REMOVAL

4. Behind cartridge, separate air tube coupling (cw) from old cartridge.

5. Loosen wingnuts (four) holding cartridge in filter housing.
   Tmpry stow wingnuts.

6. Remove old cartridge and dispose in Trash Bag.

PREPARE NEW HARMFUL CONTAMINANT CARTRIDGE FOR INSTALLATION

7. Remove wrapping from new cartridge.

8. Detach cap from outlet from new cartridge and dispose in Trash Bag.

9. Wrap old cartridge using wrapper.
   Stow in bag.

10. Detach cap from inlet from new cartridge
    Move locking tabs away from wingnuts (four).
    Loosen wingnuts (four).
    Move lock levers (four) away from cartridge.
    Remove inlet cap from cartridge and stow cap in Trash Bag.
    Restore four lock levers into initial position.
    Tighten four wingnuts (hand tighten).
    Lock four wingnuts using four locking tabs.

INSTALL NEW HARMFUL CONTAMINANT CARTRIDGE

11. Install new cartridge into filter housing.

12. Secure cartridge with four wingnuts (stowed earlier).

13. Connect coupling of air tube (ccw) to cartridge.

PANEL CLOSEOUT

14. Install panel and secure with standard bolts using TBD tools.

FGB DUST COLLECTOR REPLACEMENT

TOOLS REQUIRED;
Standard Screwdriver

SAFING

EPCS FGB: ECLSS

FGB: ECLSS

1. √Dust Fan 1,2,3,4 (four) Volts ≅ 0

PANEL REMOVAL

Panels 202, 403

2. Remove blue launch restraint bolts (6 --- 8 bolts depending on panel) from closeout panels using Standard Screwdriver.
   Dispose launch restraints bolts in Trash Bag.

3. Remove panel fasteners with tool and open panel.

REMOVAL

4. Remove six launch restraint screws securing filter using Standard Screwdriver.
   Dispose launch restraints bolts in Trash Bag.

5. Open grille using two thumb latches.

6. Slide filter housing until stop reached.

7. Grasp gasket and remove filter element/gasket assembly.
   Dispose of filter element/gasket assembly in Trash Bag.

INSTALLATION

Panel 414

8. Unstow new filter element/gasket assembly.

9. Install new filter element/gasket on filter housing ensuring black lines aligned with placement of thumb latches.

NOTE
For proper fit of gasket around perimeter of filter housing.

10. Alignment

11. Install filter housing.

12. Close grille using two latches.

13. Close panel.

14. Inform **MCC-H**, “FGB Dust Collector Replacement complete.”

FGB HEAT EXCHANGER FILTER CLEANING

TOOLS REQUIRED:
Standard Screwdriver
Duct Tape
Trash Bag

SAFING - GAS/LIQUID HEAT EXCHANGER ASSEMBLIES

PCS FGB: ECLSS

FGB: ECLSS

1. √VT1(2,3,4,5,6) - Off

2. Details of PCS to next pop-up

PANEL REMOVAL

Aft ICC Panels 227 (314, 427)

3. Remove blue launch restraint bolts(6 --- 8 bolts depending on panel) from Closeout Panels using Standard Screwdriver.
   Dispose of launch restraints bolts in Trash Bag.

4. Remove standard panel TBD fasteners with TBD tool and open panel.

FILTER CLEANING

5. Perform visual inspection of filter housing compartment and remove any large pieces of debris.

6. Loosen by hand two captive fasteners from filter and pull out filter using handle.

7. Clean filter using Duct Tape.
   Dispose of tape in Trash Bag and transfer to shuttle trash compartment.

FILTER INSTALLATION

NOTE
Proper filter installation requires alignment with filter slide.

8. Install filter and secure with two bolts, tighten by hand.

PANEL CLOSEOUT

9. Install panel and secure with standard bolts using TBD tools.

FGB VENTILATION SCREEN CLEANING

TOOLS REQUIRED:
Duct Tape
Trash bag

VENTILATION SCREEN CLEANING

Fwd ICC Panels 201 (301, 401)

1. Clean three ventilation screens using Duct Tape.
2. Dispose of tape in Trash Bag and transfer to shuttle trash compartment.

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EPS PROCEDURES

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APCU ACTIVATION

CAUTION

To prevent damage to the internal converters and the relay, the APCU output relay must not be opened or closed under load (Converter – On (tb – gray)).

CRT — SM 200 APCU Status

1. VERIFY PAYLOAD PRIMARY MAIN C ON

R1 — √PL PRI MNC tb – On

2. VERIFY PAYLOAD CABIN BUS ON

√PL CAB – MNA

3. VERIFY SWITCH POWER

SSP2 (L12L) — √SW PWR CB1 – On

SSP1 (L12U) — √SW PWR CB2 – On

4. CLOSE APCU OUTPUT RELAY

√APCU1(2) CONV tb – bp

APCU1(2) OUTPUT → On

5. TURN APCU CONVERTER ON

APCU1(2) CONV → On

√APCU1(2) CONV tb – gray

√APCU1(2) OUTPUT tb – gray

CRT — SM 200 APCU Status

√APCU1(2) OUT VOLTS RES LOW ≥ 122

APCU DEACTIVATION

CAUTION

To prevent damage to the internal converters and the relay, the APCU output relay must not be opened or closed under load (Converter – On (tb – gray)).

CRT — SM 200 APCU Status

1. TURN APCU CONVERTER OFF

SSP1 (L12U)
APCU1(2) CONV → Off
√APCU1(2) CONV tb – bp
√APCU1(2) OUTPUT tb – bp

2. OPEN APCU OUTPUT RELAY

APCU1(2) OUTPUT → Off

3. POWER DOWN SUPPLY AND CONTROL BUSSES

√**MCC-H GO** for PL PRI and PL Cabin Power Down

R1
PL PRI MNC → Off
√PL PRI MNC tb – Off
PL CAB → Off

NODE 1 POWERDOWN AND RECOVERY

1. Obtain the powerdown target value from **MCC** and continuing work the powerdown in order until the target value is reached.

2. Use the POWERUP column in reverse order to back out of the powerdown.

3. The POWERUP column will also be used to recover from an automatic Loadshed.

4. The loads for the major power users are presented below.

NOTE
During Node 1 Pre-Ingress Warm-up, Ingress, and Post Egress Dryout, the Node 1 and PMA 1 Shell Heater power allocation will vary.

Equipment	dc Watts
Node 1 Shell Heaters	0 W predicted Total for String B 1284 W
PMA 1 Shell Heaters	40 W predicted Total for String B 272 W
Early Comm	340 W
MDM N1-1	70 --- 90 W
MDM N1-2	70 --- 90 W

	POWERDOWN	POWERUP
	NOTE Depending on the heater configuration, power usage may not decrease after every step.	
	1. POWER DOWN TARGET VALUE Obtain power down target value, XX, from **MCC-M** _____ kw Continue performing steps until RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX.	
PCS	2. INHIBIT NODE 1 A HTRS (1 --- 4) Node 1: TCS Node 1: TCS 'NODE 1' sel Node 1 Htr [X]A X = 1 2 3 4 sel Htr Commands (lower left side) **cmd** Inh **Execute** √Node 1 Htr[X]A Availability - Inh Repeat FGB: EPS FGB: EPS √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >>	**cmd** Ena BU **Execute**
	3. INHIBIT NODE 1 B HTRS (1 --- 4) Node 1: TCS Node 1: TCS 'NODE 1' sel Node 1 Htr [X]B X = 1 2 3 4 sel Htr Commands (lower right side) **cmd** Inh **Execute** √Node 1 Htr[X]B Availability - Inh Repeat FGB: EPS FGB: EPS √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >>	**cmd** Ena Opr **Execute**

POWERDOWN	POWERUP
4. <u>INHIBIT NODE 1 A HTRS (5 --- 9)</u> Node 1: TCS [Node 1: TCS] 'NODE 1' sel Node 1 Htr [X]A X = [5] [6] [7] [8] [9] sel Htr Commands (lower left side) **cmd** Inh **Execute** √Node 1 Htr[X]A Availability - Inh Repeat FGB: EPS [FGB: EPS] √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >>	**cmd** Ena BU **Execute**
5. <u>INHIBIT NODE 1 B HTRS (5 --- 9)</u> Node 1: TCS [Node 1: TCS] 'NODE 1' sel Node 1 Htr [X]B X = [5] [6] [7] [8] [9] sel Htr Commands (lower right side) **cmd** Inh **Execute** √Node 1 Htr[X]B Availability - Inh Repeat FGB: EPS [FGB: EPS] √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >>	**cmd** Ena Opr **Execute**

POWERDOWN	POWERUP
6. INHIBIT PMA1 A AND B SHELL HTRS Node 1: TCS Node 1: TCS 'PMA 1' sel PMA 1 Htr [X]A X = 1 3 4 5 sel Htr Commands (lower left side) **cmd** Inh **Execute** √PMA 1 Htr[X]A Availability - Inh Repeat sel PMA 1 Htr [X]B X = 1 2 3 5 sel Htr Commands (lower right side) **cmd** Inh **Execute** √PMA 1 Htr[X]B Availability - Inh Repeat FGB: EPS FGB: EPS √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >>	**cmd** Ena BU **Execute** **cmd** Ena Opr **Execute**
7. DISABLE INTERNAL EARLY COMM EQUIPMENT NOTE The Early Comm equipment is powered by the stbd CBM RPCs. Node 1: EPS: RPCM N1RS2 A RPCM N1RS2 A sel RPCM Detail sel RPC [X] X = 5 6 10 11 **cmd** Open **Execute** √Position - Op Repeat FGB: EPS FGB: EPS √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >>	**cmd** Close **Execute**

POWERDOWN	POWERUP
8. TURN OFF EARLY COMM ANTENNAS AND ANTENNA HEATERS **CAUTION** The Early Comm Antennas may experience hardware damage after 10 hours with out heater power. Node 1: EPS: RPCM N1RS1 C RPCM N1RS1 C sel RPCM Detail sel RPC [X] X = 5 6 12 13 **cmd** Open **Execute** √Position - Op Repeat FGB: EPS FGB: EPS √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >>	**cmd** Close **Execute**
9. POWERDOWN OF N1-1 MDM √**MCC-H** before powerdown of N1-1 MDM Inhibit NCS Autoretry Node 1: C&DH: MDM N1-2 Primary NCS MDM Node 1 'Software Control' sel MDM Utilities sel Commands **cmd** Prim_NCS_Inh_NCS_Retry **Execute** Primary_NCS_MDM_Utilities √Auto Retry Inhibit - X	**cmd** Prim_NCS_Ena_Retry **Execute** √Auto Retry Inhibit - <blank>

POWERDOWN	POWERUP
Command N1-1 to Diagnostics NOTE Expect PCS FDA 'CDH MDM N1-2 detected RT fail MDM N1-1 - PMA1'. Node 1: C&DH: MDM N1-1 Secondary NCS MDM Node 1 'MDM Major State' sel Commands **cmd** N1_1_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute** **cmd** N1_1_MDM_Xsitn_Dgnstc_State **Execute** Remove Power From N1-1 MDM and SDO Card Node 1: EPS: RPCM: N1RS1 A RPCM N1RS1 A sel RPCM Detail sel RPC[X] X = 5 11 **cmd** Open **Execute** √Position - Op Repeat Verify N1-2 MDM Survival Heater Off Node 1: EPS: RPCM: N1RS1 C RPCM N1RS1 C √RPC 2 Position - Op FGB: EPS FGB: EPS √RACU 5 Output Pwr, kW + RACU 6 Output Pwr, kW ≤ XX kw >> 10. POWERDOWN OF N1-2 MDM √**MCC-H** before powerdown of N1-2 MDM Node 1: EPS: RPCM: N1RS2 C RPCM N1RS2 C sel RPCM Detail sel RPC[X] X = 3 15 13 **cmd** Open **Execute** √Position - Op Repeat	**cmd** N1_1_MDM_ Xsitn_Second_state **Execute** √State - Secondary **Cmd** Close **Execute** √**MCC-H**

RACU ACTIVATION

1. VERIFY FGB COMMAND STATUS

NOTE
RACU commands sent from Orbiter will not work if FGB relay matrix is in **MCC-M** command state (COMMANDING - INH). Crew can follow ground activities using the "If ENA" block below.

CRT SM 204 FGB

√COMMANDING - INH

2. If COMMANDING - INH

Shuttle ⇓ **MCC-H**: "Ready for RACU5(6) Power On"
MCC-H ⇒ **MCC-M**: "Go for RACU5(6) Power On"

RUSSIAN GROUND	AOS	LOS
Pass 1	___/___:___:___	___/___:___:___
Pass 2	___/___:___:___	___/___:___:___

MCC-M ⇒ **MCC-H** ⇑ Shuttle: "RACU5(6) Power On at ___/___:___:___ GMT"

3. If COMMANDING - ENA

Shuttle ⇓ **MCC-H**: "Ready for RACU5(6) Power On"
MCC-M ⇒ **MCC-H**: "Go for RACU5(6) Power On"
MCC-H ⇑ Shuttle: "Go for RACU5(6) Power On"

On MCC GO

CRT SM 204 FGB

PCS nav FGB: EPS
FGB: EPS

FGB: EPS

√FGB Main Bus Voltage 1,2 (two): 28.0 --- 29.0 V
√FGB Batt Voltage 1 --- 6 (six) > 25.5 V

****
* If any FGB Batt Voltage < 25.5 Volts, then *
* notify **MCC**: "FGB Batteries Low." *
* Wait one orbit for FGB batteries to charge. *
****

CRT SM 210 NODE

√FRM CTR - Incrementing

If FRM CTR - Static

SM 204 FGB

RACU 5(6) PWR ON VIA FGB - ITEM 1 (ITEM 3) EXEC

√RACU 5(6) Power On - ∗

√Input Amps > 3.0 A

√Output Volts: 121---125 V

√Amps: 0.3 --- 10 A

NOTE

Amperage should be at 0.5 amps at power On. Amperage could be as high as 10 amps after MDM initialization (approximately 2.5 minutes), depending on heater usage.

```
**************************************************
*  If RACU 5(6) OUT AMPS > 10                    *
*    RACU 5(6) PWR OFF VIA FGB - ITEM 5          *
*    (ITEM 7) EXEC                               *
**************************************************
```

If FRM CTR - Incrementing

SM 204 FGB

RACU 5(6) PWR ON VIA NCS - ITEM 2 (ITEM 4) EXEC

√RACU 5(6) Power On - ∗

√Input Amps > 3.0 A

√Output Volts: 121---125 V

√Amps: 0.3 --- 10 A

NOTE

Amperage should be at 0.5 amps at power On. Amperage could be as high as 10 amps after MDM initialization (approximately 2.5 minutes), depending on heater usage.

```
**************************************************
*  If RACU 5(6) OUT AMPS > 10                    *
*    RACU 5(6) PWR OFF VIA FGB - ITEM 6          *
*    (ITEM 8) EXEC                               *
**************************************************
```

PCS

nav FGB: EPS

FGB: EPS

sel RACU Details
sel Commands
cmd FGB RACU 5(6) - On **Execute**
√RACU 5(6) Converter - On
√RACU 5(6) Converter Input Current > 3.0 A
√Output Current: 0.5 --- 10 A
√Voltage: 121 --- 125 V

NOTE

Amperage should be at 0.5 amps at power On. Amperage could be as high as 10 amps after MDM initialization (approximately 2.5 minutes), depending on heater usage.

****
* If RACU 5(6) Output Current > 10 *
* sel Commands *
* **cmd** FGB RACU 5(6) - Off **Execute** *
****

RACU 5 DEACTIVATION

NOTE
This procedure assumes that MDM N1-2 is Primary and MDM N1-1 is Secondary.

1. INHIBIT NCS AUTORETRY

PCS — Node 1: C&DH: MDM N1-1
Secondary NCS MDM Node 1
'Software Control'

sel MDM Utilities
sel Commands

cmd Second_NCS_Inh_NCS_Retry **Execute**

Secondary_NCS_MDM_Utilities
√Auto Retry Inhibit - X

2. COMMAND N1-2 TO DIAGNOSTICS

NOTE
1. Expect 'Disconnect' message on PCS.
2. Possible PDI DECOM Fail message.

Node 1: C&DH: MDM N1-2
Primary NCS MDM Node 1
'MDM Major State'

sel Commands
cmd N1_2_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute**
cmd N1_2_MDM_Xsitn_Dgnstc_State **Execute**

3. TELEMETRY RECOVERY ON OIU

CRT — SM 212 OIU

BUS 4 BC - ITEM 15 EXEC (*)
BUS 3 RT - ITEM 10 EXEC (*)

Change OIU N1 Phys Dev to N1-1 - ITEM 18 +4 EXEC

Wait 1 minute from diagnostic command.

CRT — Reload OIU Format 2 - ITEM 1 +2 EXEC

4. TELEMETRY RECOVERY ON PCS

PCS On PCS attached to PDIP N1-2 port

sel icon to open PCS CDS Main Control Panel Window
√status box - yellow
sel 'Connect to MDM'
√status box - green

Verify 'connected to MDM' indicated.

Home page will display when load complete (~1 minute).

NOTE
Expect PCS FDA 'CDH MDM N1-1 detected RT fail MDM N1-2 - PMA1'.

Node 1: C&DH: MDM N1-1
Primary NCS MDM Node 1
'MDM Major State'

√State - Primary

****
* If State not Primary or no N1-1 TLM *
* √**MCC** *
****

5. REMOVE POWER FROM N1-2 MDM AT RPC

NOTE
Expect PCS FDA (LED and message only) when MDM power removed.

Node 1: C&DH: MDM N1-2
Secondary NCS MDM Node 1
'RPCM N1RS2 C'

sel RPC 13
sel Commands
cmd Open **Execute**
√Position - Op

6. DISABLE RT DEVICES I/O ON EPS BUSES

PCS Node 1: C&DH: MDM N1-1
Primary NCS MDM Node 1

sel UB EPS_N1 23
sel RT Status
sel Inhib_RT Commands

PRIM_NCS_UB_EPS_N1_23_Inhib

cmd Inhib_RPCM_N1RS1_A **Execute**
cmd Inhib_RPCM_N1RS1_B **Execute**
cmd Inhib_RPCM_N1RS1_C **Execute**

PRIM_EPS_N1_23_RT Status

√RT Inhibit 20, 19, 18 (three) – X

7. COMMAND FGB RACU-5 OFF

NOTE
RACU commands sent from Orbiter will not work if FGB relay matrix is in **MCC-M** command state (COMMANDING - INH). Crew can follow ground activities using the "If ENA" block below.

CRT SM 204 FGB

√COMMANDING - INH (Moscow Commanding)

If COMMANDING - INH

Crew ⇓ **MCC-H**: "Ready for RACU 5 Power OFF"
MCC-H ⇒ **MCC-M**: "Go for RACU 5 Power OFF"

RUSSIAN GROUND	AOS	LOS
Pass 1	___/___:___:___	___/___:___:___
Pass 2	___/___:___:___	___/___:___:___

MCC-M ⇒ **MCC-H** ⇑ Crew:
"RACU 5 Powered Off at __/___:___:__GMT"

If COMMANDING - ENA

MCC-M ⇒ **MCC-H**: "Go for RACU 5 Power OFF"
MCC-H ⇑ Crew: "Moscow GO for RACU 5 Power OFF"

On MCC GO

MCDS SM 204 FGB

RACU 5 Power OFF VIA NCS – ITEM 6 EXEC
√RACU 5 Input Amps < 2.0 A
√Output Volts ~0.0 V
√RACU 5 Power Off - ∗

PCS

nav FGB: EPS
FGB: EPS: RACU Details
RACU Details

sel Commands
cmd RACU 5 - Off **Execute**
√RACU 5 Converter - Off
√RACU 5 Input Current < 2.0 A
√Output Voltage ~0.0 V

RACU 6 DEACTIVATION

NOTE
This procedure assumes that MDM N1-2 is Primary and MDM N1-1 is Secondary.

1. INHIBIT NCS AUTORETRY

PCS Node 1: C&DH: MDM N1-2
Primary NCS MDM Node 1
'Software Control'

sel MDM Utilities
sel Commands

cmd Prim_NCS_Inh_NCS_Retry **Execute**

Primary_NCS_MDM_Utilities
√Auto Retry Inhibit - X

2. COMMAND N1-1 TO DIAGNOSTICS

NOTE
Expect PCS FDA 'CDH MDM N1-2 detected RT fail MDM N1-1 - PMA1'.

Node 1: C&DH: MDM N1-1
Secondary NCS MDM Node 1
'MDM Major State'

sel Commands
cmd N1_1_MDM_Cmd_Xsitn_Dgnstc_State_Arm **Execute**
cmd N1_1_MDM_Xsitn_Dgnstc_State **Execute**

3. REMOVE POWER FROM N1-1 MDM
'RPCM N1RS1 A'

sel RPC 11
sel Commands
cmd Open **Execute**
√Position - Op

4. DISABLE RT DEVICES I/O ON EPS BUSES

PCS

Node 1: C&DH: MDM N1-2

Primary NCS MDM Node 1

sel UB EPS_N1-14
sel RT Status
sel Inhib_RT Commands

PRIM_NCS_UB_EPS_N1_14_Inhib

cmd Inhib_RPCM_N1RS1_A **Execute**
cmd Inhib_RPCM_N1RS1_B **Execute**
cmd Inhib_RPCM_N1RS1_C **Execute**

RT Status

√RT Inhibit 20, 19, 18 (three) – X

5. COMMAND FGB RACU 6 OFF

NOTE

RACU commands sent from Orbiter will not work if FGB relay matrix is in **MCC-M** command state (COMMANDING - INH). Crew can follow ground activities using the "If ENA" block below.

CRT

SM 204 FGB

√COMMANDING - INH (Moscow Commanding)

If COMMANDING - INH

Crew ⇓ **MCC-H**: "Ready for RACU 6 Power OFF"
MCC-H ⇒ **MCC-M**: "Go for RACU 6 Power OFF"

RUSSIAN GROUND	AOS	LOS
Pass 1	___/___:___:___	___/___:___:___
Pass 2	___/___:___:___	___/___:___:___

MCC-M ⇒ **MCC-H** ⇑ Crew:
"RACU 6 Powered Off at __/___:___:__ GMT"

If COMMANDING - ENA

MCC-M ⇒ **MCC-H**: "Go for RACU 6 Power OFF"
MCC-H ⇑ Crew: "Moscow GO for RACU 6 Power OFF"

On MCC GO

MCDS

SM 204 FGB

RACU 6 Power OFF VIA NCS – ITEM 8 EXEC
√RACU 6 Input Amps < 2.0 A
√Output Volts: 0.0 V
√RACU 6 Power Off - *

PCS

nav FGB: EPS
FGB: EPS: RACU Details
RACU Details

sel Commands
cmd RACU6 - Off **Execute**
√RACU 6 Converter - Off
√RACU 6 Input Current < 2.0 A
√RACU 6 Output Voltage ~0.0 V

RPC OPEN/CLOSE

RPC OPEN/CLOSE (FOR ONE RPC)

1. Close RPC

PCS nav Node 1: EPS: RPCM #### #

RPCM #### #

sel RPC [X] X = any RPC 1 --- 18
√Close Cmd - Ena

√**MCC-H**

cmd Close **Execute**
√Position - Cl

2. Open RPC

nav Node 1: EPS: RPCM #### #

RPCM #### #

sel RPC [X] X = any RPC 1 --- 18
√Open Cmd - Ena

√**MCC-H**

cmd Open **Execute**
√Position - Op

RPC OPEN/CLOSE (FOR MULTIPLE RPCS)

1. Close RPCs

PCS nav Node 1: EPS: RPCM #### #

RPCM #### #

sel RPCM Details
√RPC [N] Close Cmd - Ena

√**MCC-H**

sel RPC [N] N = N+1 , N+2

cmd Close **Execute**
√RPC [N] Position - Cl

Repeat

2. Open RPCS

nav Node 1: EPS: RPCM #### #

RPCM #### #

sel RPCM Details
√RPC [N] Open Cmd - Ena

√**MCC-H**

sel RPC [N] N = N+1 , N+2

cmd Open **Execute**
√RPC [N] Position - Op

Repeat

RPCM BDT

1. COORDINATE DOWNLINK WITH ODIN
   Call ODIN on the FMT DVIS loop to coordinate the upcoming downlink requests.

2. TRANSFER DATA FROM THE RPCM TO THE MDM IN FOUR PASSES
   Node 1:EPS:RPCM #### #

CDDT sel Firmware Detail
sel Commands

For BDT Segment [x], x = 1, 2, 3, 4

cmd BDT - Perform
Start Address = _____
Number of Words = _____
Execute

3. PERFORM DATA DUMP FROM MDM TO **MCC-H**

NOTE
If the RPCM is connected to the Primary MDM, a single Data Dump of 32 words is sufficient to downlink the BDT segment results. If the RPCM is connected only to the Secondary MDM (possible for N13B and N14B), then two Data Dumps of 16 words each are required for the full BDT segment downlink.

If prebuilt data dump command is not available

Command Inventory: Data Dump Preparation
Data Dump Preparation

sel Source Device
Choose device from the list.
input _____
input 16 or 32
√Memory Type - DRAM
sel One-Shot Delivery
input Save Dump to File
sel path/filename to save data dump.

NOTE
Every pass through the Data Dump portion of this procedure must write the data to a different filename to avoid loss of data.

sel Select Dump File
Navigate to the directory you want to save the dump file to
sel the filename
sel Store In Command Inventory

Uplink Data Dump command
Command Inventory: Data Dump Command Inventory
Data Dump Command Inventory

Select Data Dump command for correct RPCM

sel Submit to FMT

Downlink Manager
Downlink FMT Manager

√FMT Dump Status - 100% Complete

If Entire Hindsight Buffer (all four BDT segments) has been downlinked, proceed to step 4; otherwise, return to step 1 and downlink the next BDT Segment.

4. PROCESS AND INTERPRET THE HINDSIGHT BUFFER DATA
Process the four or eight data dump files through the TBS application and plot the output.

Determine if the plot is indicative of an overcurrent trip.

RPCM ADDRESS TABLE

BDT Segment	Start Address	Number of Words
1	4096	28
2	4124	28
3	4152	28
4	4180	20

MDM ADDRESS TABLE

RPCM Name	MDM BDT Buffer Address	Connected to Both N1 MDMs?	Connected MDM
RPCM N13B A	2474048	N	N1-2
	2474064	address of second dump for N13B A	
RPCM N13B B	2474560	N	N1-2
	2474576	address of second dump for N13B B	
RPCM N13B C	2475072	N	N1-2
	2475088	address of second dump for N13B C	
RPCM N14B A	2481728	N	N1-1
	2481744	address of second dump for N14B A	
RPCM N14B B	2482240	N	N1-1
	2482256	address of second dump for N14B B	
RPCM N14B C	2482752	N	N1-1
	2482768	address of second dump for N14B C	
RPCM N1RS1 A	2479168	Y	Both
RPCM N1RS1 B	2479680	Y	Both
RPCM N1RS1 C	2480192	Y	Both
RPCM N1RS2 A	2476608	Y	Both
RPCM N1RS2 B	2477120	Y	Both
RPCM N1RS2 C	2477632	Y	Both

L&M PROCEDURES

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CHARCOAL FILTER R&R NODE 1

OBJECTIVE
Remove and replace expended Charcoal Filters

LOCATION
Installed: Midbay Nadir NOD1D3-1,3
Stowed: √Maint Dbase

DURATION
28 minutes

PARTS
Four Charcoal Filters, Part #SV810010

MATERIALS
Failed equipment bag

TOOLS REQUIRED
1/4" Power Driver
Kit H:
5/32" Hex Head Driver, 1/4" Drive

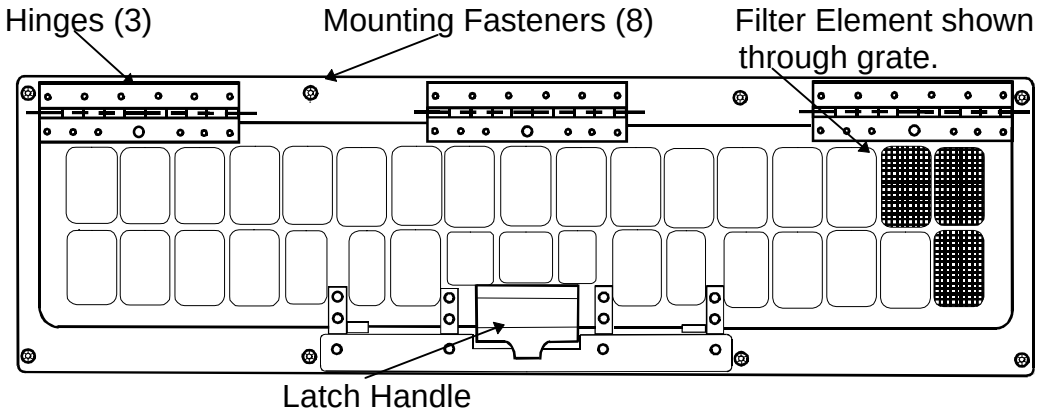

Figure 1.- Front view of filter assembly door.

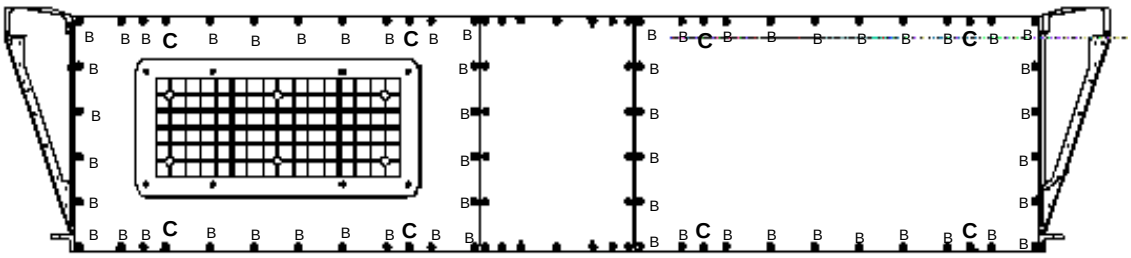

Figure 2.- Front view of midbay nadir panels with fasteners marked (C).

SAFE

WARNING

Health hazard exists for failure to close Rheostat Air Mixture Valve (RAMV) and deactivate Cabin Fan. Failure to comply can result in circulating contaminated air.

CAUTION

The Area Smoke Detectors (ASD) are mounted on the backside of Closeout Panels NOD1D3-1,3. Power to the ASD must be deactivated by ECLSS prior to maintenance. An adequate length of ASD power cable has been provided to open Closeout Panels and allow access to the maintenance areas. Failure to comply may damage ASD, power cable, and/or Closeout Panels.

1. Position RAMV to “FULL HOT” position.
2. Perform NODE 1 CABIN FAN DEACTIVATION, all (ECLSS).

NOTE

Fasteners on the Closeout Panels can be used for tethering the panels to nearby structure during maintenance.

3. Loosen fasteners (four) from each panel (two) (1/4” Power Driver; 5/32” Hex Head, 1/4” Drive) (NOD1D3-1,3).
4. Remove, temporary stow Closeout Panels from secondary structure.

REMOVE

5. Remove, temporary stow new filter from containment bag.
6. Open filter assembly door, position loose particles containment bag over expended charcoal filter, collapsing it to pull strap in center of filter, pull charcoal filter in to bag, and close. Temporary stow.

REPLACE

7. Install new filter and close assembly door.
8. Repeat steps 5, 6, and 7 for remaining filters (three).

CLOSE-OUT

9. Replace panels (two).
   Secure fasteners (four) on each panel.
10. Position Control Damper Assembly away from “FULL HOT” position.
11. Perform NODE 1 CABIN FAN ACTIVATION, all (ECLSS).

CHECK-OUT

12. Stow expended filters and tools.

13. Update Maint Dbase.

RACK PIVOT PIN INSTALL NODE 1

OBJECTIVE**:**
Install rack pivot pins onto pivot pin fittings.

LOCATION:
NOD1D4

DURATION:
Thirty minutes

PARTS:
Pin, Rack Pivot-Midbay (P/N 1F89557-1)
Pin, Rack Pivot-Aft (P/N 1F89544-1)

MATERIALS:
None

TOOLS REQUIRED:
Kit D:
- 6”, 3/8” Hex Head, 3/8” Drive
- 3/16” Hex Head, 3/8” Drive

Kit E:
- Ratchet 3/8” Drive

Kit I:
- Common Tip Screwdriver 4”

REFERENCED PROCEDURE(S):
None

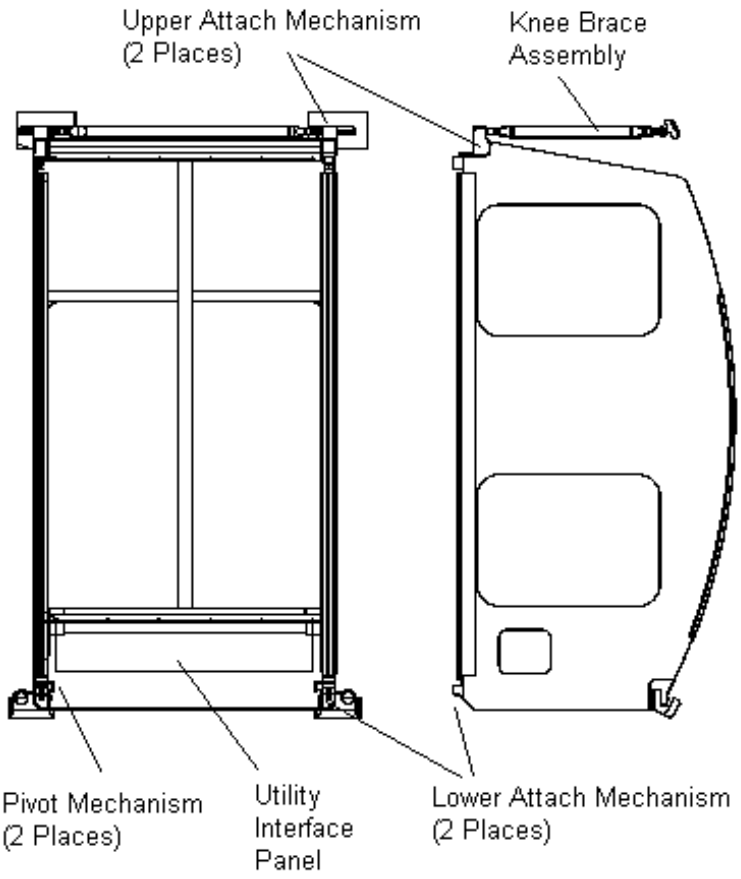

Figure 1.- Rack Attachment Mechanisms.

ACCESS

1. Remove Utility Interface Panel (UIP) Close-out from rack, 1/4 turn fastener (two).

DISENGAGE RACK LOWER ATTACH MECHANISMS

CAUTION
Disengagement sequence must be followed exactly to prevent equipment damage. This process allows any induced loads to be released safely back into structure.

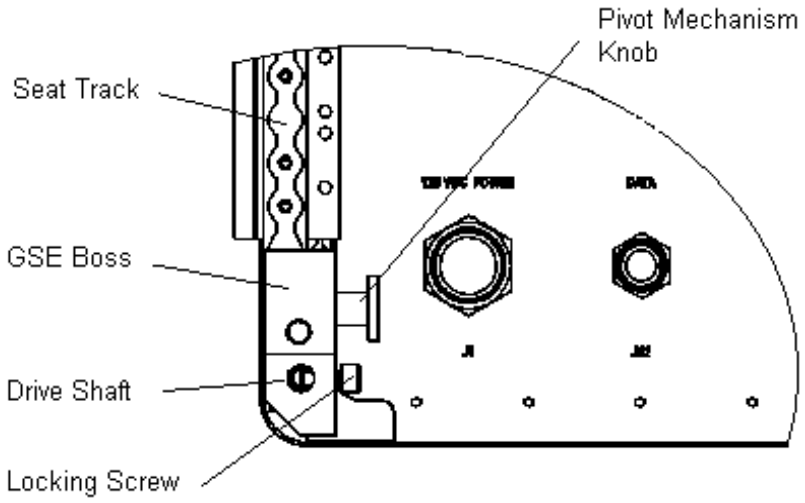

Figure 2.- Lower Attach Mechanism (left side).

NOTE
Lower Attach Mechanism Locking Screw is non-captive.

2. Loosen left Locking Screw (Ratchet 3/8” Drive, 3/8” Hex Head) 10 --- 12 turns or until Drive Shaft hole is clear. See Figure 2.
3. Disengage left Drive Shaft (Ratchet 3/8” Drive, 3/8” Hex Head) until bolt head is flush with bottom of bolt hole. See Figure 2.
4. Tighten, snug left Locking Screw (Ratchet 3/8” Drive, 3/8” Hex Head). See Figure 2.
5. Repeat steps 2 --- 4 for right Lower Attach Mechanism.
6. Tighten, snug both Pivot Mechanism Knobs in unlatched position. See Figure 2.

INSTALL RACK PIVOT PINS

7. Install endcone (aft) rack pivot pin onto fitting.
   Tighten snug by hand, then with tool (Common Tip Screwdriver).
8. Install midbay (forward) rack pivot pin onto fitting.
   Tighten snug by hand, then with tool (Ratchet 3/8” Drive, 3/16” Hex Head).
9. Tighten, snug both Pivot Mechanism Knobs in latched position.

CLOSE-OUT

10. Attach Utility Interface Panel Close-out, 1/4 fastener (two).

POST MAINTENANCE

11. Stow tools.

MCS PROCEDURES

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ACS MODING ACTIVATION AND CHECKOUT

1. VERIFY NCS CDH COMMAND CAPABILITY AND AVAILABILITY

PCS ACS Moding
ACS Moding
'C&DH'

√Major State/MDM ID Primary NCS - Primary/N1-2

√ACS Moding Application Status Primary NCS - Init/Ena

√Major State/MDM ID Secondary NCS - Sec/N1-1

√ACS Moding Application Status Secondary NCS - Init/Ena

2. NCS ACS MODING ROLE CONFIGURATION

PCS ACS Moding
ACS Moding
'ACS Configuration'

NOTE
Moding the NCS software to FULL allows the NCS MDMs to monitor both sets of PMA docking sensors.

sel Moding Role Primary NCS - Command
cmd Arm **Execute**
√Moding Role Arm Primary NCS - X

sel Moding Role Primary NCS - Command
cmd Full **Execute**
√Moding Role Arm Primary NCS - Blank
√Moding Role Primary NCS - Full

sel Moding Role Secondary NCS - Command
cmd Arm **Execute**
√Moding Role Arm Secondary NCS - X

sel Moding Role Secondary NCS - Command
cmd Full **Execute**
√Moding Role Arm Secondary NCS - Blank
√Moding Role Secondary NCS - Full

****
* If Primary/Secondary NCS Moding Role Arm is not Blank (Off), *
* or the need to set the Mode Role has been deferred, then the *
* following command should be sent. *
* *
* sel Moding Role Primary, Secondary NCS - Command *
* **cmd** Disarm **Execute** *
* √Moding Role Arm Primary, Secondary NCS - Blank *
****

'ACS Configuration'

√LED Control SW Primary NCS - Inh
√LED Control SW Secondary NCS - Inh

√PMA2 LED State Primary NCS - Off
√PMA2 LED State Secondary NCS - Off

√PMA3 LED State Primary NCS - Off
√PMA3 LED State Secondary NCS - Off

3. PMA 2(3) ARRIVAL SOFTWARE DEFAULT VERIFICATION

NOTE
1. This section verifies the default values of the NCS ACS software after MDM activation.
2. The hardware signals on the "ACS Moding HW Signals" page should be verified according to the current docked configuration - this check is not explicitly called out as a procedural step.

PCS ACS Moding
ACS Moding
'Arrival'

√PMA2 Arrival Response SW Arm Primary NCS - Blank
√PMA2 Arrival Response SW Primary NCS - Inh

√PMA2 Arrival Response SW Arm Secondary NCS - Blank
√PMA2 Arrival Response SW Secondary NCS - Inh

√PMA3 Arrival Response SW Arm Primary NCS - Blank
√PMA3 Arrival Response SW Primary NCS - Inh

√PMA3 Arrival Response SW Arm Secondary NCS - Blank
√PMA3 Arrival Response SW Secondary NCS - Inh

√Arrival Event Primary NCS - Blank
√Arrival Event Secondary NCS - Blank

4. PMA 2(3) DEPARTURE SOFTWARE DEFAULT VERIFICATION
'Departure'

√PMA2 Departure Response SW Arm Primary NCS - Blank
√PMA2 Departure Response SW Primary NCS - Inh

√PMA2 Departure Response SW Arm Secondary NCS - Blank
√PMA2 Departure Response SW Secondary NCS - Inh

√PMA3 Departure Response SW Arm Primary NCS - Blank
√PMA3 Departure Response SW Primary NCS - Inh

√PMA3 Departure Response SW Arm Secondary NCS - Blank
√PMA3 Departure Response SW Secondary NCS - Inh

√Departure Event Primary NCS - Blank
√Departure Event Secondary NCS - Blank

5. VERIFY RUSSIAN SEGMENT MODE STATUS

√**MCC-H** has attained confirmation that NCS is monitoring the proper RS signals (i.e., FGB or SM): pending data dump of buffer information, 2A - FGB.

'ACS Configuration'

√RS Mode Primary, Secondary NCS - Drift

PCS FGB: MCS
FGB: MCS

√GNC State - Drift

NOTE
If RS Mode is BLANK, then, confirmation of RS systems status should be completed via voice communications.

ACS PRE-DEPARTURE MODING CONFIGURATION

NOTE
Set/Configure Pending Back Off timer a minimum of one hour before undocking. Program default is 10 seconds.

1. SET PENDING BACK OFF TIMER FOR ORBITER DEPARTURE

PCS ACS Moding

ACS Moding

'Departure'

sel Pending Back Off Time Primary NCS - Command
cmd 10 seconds **Execute**
√Back Off Time Arm Primary NCS - X
√Pending Back Off Time Primary NCS - 00:10

sel Pending Back Off Time Secondary NCS - Command
cmd 10 seconds **Execute**
√Back Off Time Arm Secondary NCS - X
√Pending Back Off Time Secondary NCS - 00:10

```
**************************************************************************
*  If the Pending Back Off Time needs to be canceled or configured  *
*  later, disarm the current Pending Time as follows:               *
*                                                                   *
*       sel Back Off Time Primary NCS - Command                     *
*       cmd Cancel_Pending_Back_Off_Time  Execute                   *
*       √Back Off Time Arm Primary NCS - Blank                      *
*                                                                   *
*       sel Back Off Time Secondary NCS - Command                   *
*       cmd Cancel_Pending_Back_Off_Time  Execute                   *
*       √Back Off Time Arm Secondary NCS - Blank                    *
**************************************************************************
```

2. INCORPORATE PENDING BACK OFF TIME

sel Back Off Time Primary NCS - Command
cmd Incorporate_Pending_Back_Off_Time **Execute**
√Back Off Time Arm Primary NCS - Blank
√Back Off Time Primary NCS - 00:10

sel Back Off Time Secondary NCS - Command
cmd Incorporate_Pending_Back_Off_Time **Execute**
√Back Off Time Arm Secondary NCS - Blank
√Back Off Time Secondary NCS - 00:10

3. VERIFY ACS MODING ROLE CONFIGURATION

'ACS Configuration'

√Moding Role Primary, Secondary NCS - Full

4. VERIFY RUSSIAN SEGMENT MODE STATUS
'ACS Configuration'

√RS Mode Primary, Secondary NCS - Drift

5. VERIFY INITIAL ACS HW SIGNAL CONFIGURATION

PCS ACS Moding: ACS Moding HW Signals
ACS Moding HW Signals
'Departure'

√PMA2 Interface Sealed N1-1, N1-2 NCS - X
√PMA2 Undocking Complete N1-1, N1-2 NCS - Blank

6. VERIFY NCS SOFTWARE DEPARTURE EVENT STATUS AND CONFIGURATION

PCS ACS Moding
ACS Moding
'Departure'

√Departure Event Primary, Secondary NCS - Blank
√PMA2 Interface Sealed Primary, Secondary NCS - X
√PMA2 Undocking Complete Primary, Secondary NCS - Blank

ACS DEPARTURE MODING

1. ENABLE DEPARTURE SWITCH MONITORING FOR ACS MODING

PCS ACS Moding

ACS Moding

'Departure'

sel PMA2 Departure Response SW Primary NCS - Command
cmd Enable_Arm **Execute**
√PMA2 Departure Response SW Arm Primary NCS - X

sel PMA2 Departure Response SW Primary NCS - Command
cmd Enable **Execute**
√PMA2 Departure Response SW Arm Primary NCS - Blank
√PMA2 Departure Response SW Primary NCS - Ena

sel PMA2 Departure Response SW Secondary NCS - Command
cmd Enable_Arm **Execute**
√PMA2 Departure Response SW Arm Secondary NCS - X

sel PMA2 Departure Response SW Secondary NCS - Command
cmd Enable **Execute**
√PMA2 Departure Response SW Arm Secondary NCS - Blank
√PMA2 Departure Response SW Secondary NCS - Ena

2. VERIFY DEPARTURE EVENT SOFTWARE STATUS

'Departure'

√Departure Event Primary NCS - Blank
√Departure Event Secondary NCS - Blank

3. ENABLE LED MODE INDICATORS

NOTE

Each of the primary and secondary commands turns on two of the four ACS LED indication lights (i.e., four total). LED configurations: On - Active Attitude Control, Off - Software is Inhibited, Flash - Station in Free Drift.

'ACS Configuration'

sel LED Control SW Primary NCS - Command
cmd Enable **Execute**
√LED Control SW Primary NCS - Ena
√PMA2 LED State Primary NCS - Flash

sel LED Control SW Secondary NCS - Command
cmd Enable **Execute**
√LED Control SW Secondary NCS - Ena
√PMA2 LED State Secondary NCS - Flash

Visual verification by the orbiter crew that LED Indicators are flashing (-Z windows)

4. MONITOR AND VERIFY NCS SEPARATION SIGNALS; VERIFY ORBITER DEPARTURE AND POST SEPARATION LED MODE CHANGE
   Perform Config C&DH for Orbiter Undocking, all (C&DH:), then

   Verify **MCC-H/MCC-M GO** for Orbiter Departure.

NOTE
1. Monitor the change in parameter values during orbiter undocking. At orbiter separation (i.e., Undocking Complete is true and Interface Sealed is false), the attitude control countdown timer is initiated.
2. Monitor the timer. The primary Departure Event is received when the countdown timer reaches zero. The occurrence of this event prompts the FGB to reactivate its ACS system (this takes approximately 30 minutes).
3. For flights 2A through 3A, orbiter crew interface will be lost at OIU disconnect.
The following will be conducted via ground control.

PCS ACS Moding

ACS Moding

'Departure'

√PMA2 Interface Sealed Primary, Secondary NCS - Blank

√PMA2 Undocking Complete Primary, Secondary NCS - X

√Countdown Timer Primary NCS (Decreasing from preset Back Off Time)
√Departure Event Primary NCS - X

√Countdown Timer Secondary NCS (Decreasing from preset Back Off Time)
√Departure Event Secondary NCS - X

Visual verification by orbiter crew that LED Indicators are On (-Z windows)

5. VERIFY RUSSIAN SEGMENT MODE STATUS
   'ACS Configuration'

   √PMA2 LED State Primary NCS - On
   √PMA2 LED State Secondary NCS - On
   √RS Mode Primary NCS - Cntl
   √RS Mode Secondary NCS - Cntl

ACS POST-DEPARTURE MODING CONFIGURATION

1. DISABLE APAS LED MODE INDICATION AND VERIFY LED STATUS

NOTE
The functions in this section are to occur following the end of the Orbiter Prox-Ops phase.

PCS ACS Moding
ACS Moding
'ACS Configuration'

sel LED Control SW Primary NCS - Command
cmd Inhibit **Execute**
√LED Control SW Primary NCS - Inh
√PMA2 LED State Primary NCS - Off

sel LED Control SW Secondary NCS - Command
cmd Inhibit **Execute**
√LED Control SW Secondary NCS - Inh
√PMA2 LED State Secondary NCS - Off

2. DISABLE DEPARTURE RESPONSE
'Departure'

sel PMA2 Departure Response SW Primary NCS - Command
cmd Inhibit **Execute**
√PMA2 Departure Response SW Arm Primary NCS - Blank
√PMA2 Departure Response SW Primary NCS - Inh

sel PMA2 Departure Response SW Secondary NCS - Command
cmd Inhibit **Execute**
√PMA2 Departure Response SW Arm Secondary NCS - Blank
√PMA2 Departure Response SW Secondary NCS - Inh

√Departure Event Primary, Secondary NCS - Blank

TCS PROCEDURES

TCS

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NODE1/PMA1 SHELL WARMUP

1. DOCUMENT HEATER POWER ALLOCATION FOR WARM UP

NOTE
The heater power allocation recorded in this step is the total power available to the US segment minus the current housekeeping power.

√**MCC** for heater power allocation

Record heater power allocation: _____ W

2. NODE 1/PMA 1 SHELL HEATER PRIORITIZATION

PCS Node 1: TCS

NODE1: TCS

NOTE
Node 1 and PMA 1 Heaters are reconfigured at four hour intervals based on shell temperature and heater power allocation. The coldest areas of the PMA 1 or Node 1 Shell will be given the highest priority when heaters are enabled.

Enter a temperature reading for each Node 1 and PMA 1 Shell Heater in Table 1. For heaters with two temperature sensors, only the coldest temperature reading should be entered in the table.

Rank Node 1 and PMA 1 Shell Heaters from coldest to warmest and enter the rankings in Table 1. For heaters with identical temperatures, place heaters with lower power levels highest in the ranking

In the priority order documented in Table 1, select a group of heaters that can be commanded to the “Enabled to Operate” state within the heater power allocation recorded in step 1.

NOTE
If a given heater will cause the total heater power to exceed the power allocation documented in Step 1 then that heater should be skipped and the next heater in priority order should be compared to the power allocation. All PMA 1 and Node 1 Shell Heaters should be evaluated in priority order.

3. INHIBIT PMA 1 AND NODE 1 HEATERS NOT SELECTED FOR WARMUP

NOTE
This step inhibits Node 1 and PMA 1 Shell Heaters which are Enabled to Operate but have not been selected for the next four hour warmup period.

PCS Node 1: TCS

NODE1: TCS

If any PMA1(NODE1) Htr[X]A(B) not selected in step 2 is Ena Opr
sel PMA1(NODE1) Htr[X]A(B) [X] = as required

sel PMA1(Nod1) Htr[X]A(B) Htr Commands

PMA1(Nod1) Htr[X]A(B) COMMANDS

cmd Inh **Execute**

PMA1(Nod1) Htr[X]

√PMA1(Nod1) Htr[X]A(B) Availbty - Inh

Repeat

4. ENABLE TO OPERATE PMA 1 AND NODE 1 HEATERS SELECTED FOR WARMUP

NOTE
This step enables Node 1 and PMA 1 Shell Heaters which are Inhibited but have been selected for the next four hour warmup period.

PCS Node 1: TCS

NODE1: TCS

If any PMA1(NODE1) Htr[X]A(B) selected in step 2 is Inh
sel PMA1(Nod1) Htr[X]A(B) Htr Commands [X] = as required

PMA1(Nod1) Htr[X]A(B) COMMANDS

cmd Ena Opr **Execute**

PMA1(Nod1) Htr[X]

√PMA1(Nod1) Htr1A(B) Availbty - Ena Opr

Repeat

Wait 4 hours and repeat steps 2 to 4 until all Node 1 and PMA 1 Shell temperatures are ≥ 18 °C.

5. INIHIBIT A HEATERS AND ENABLE TO OPERATE B HEATERS FOR NODE 1/PMA 1 SHELL TEMPERATURE MAINTENANCE

NOTE
Step 5 should be executed only after all PMA 1 and Node 1 Shell temperatures are ≥ 18 °C.

PCS

Node 1: TCS

NODE1: TCS

If any PMA1(NODE1) Htr[X]A not Inh
sel PMA1(Nod1) Htr[X]A Htr Commands [X] = as required

PMA1(Nod1) Htr[X]A COMMANDS

cmd Inh **Execute**

PMA1(Nod1) Htr[X]

√PMA1(Nod1) Htr[X]A Availbty - Inh

Repeat

If any PMA1(Nod1) Htr[X]B not Ena Opr
sel PMA1(Nod1) Htr[X]B Htr Commands [X] = as required

PMA1(Nod1) Htr[X]B COMMANDS

cmd Ena Opr **Execute**

PMA1(Nod1) Htr[X]

√PMA1(Nod1) Htr[X]B Availbty - Ena Opr

Repeat

NOTE
The final configuration for PMA 1 and Node 1 Heaters is provided in Table 2. The setpoints and failure limits for each temperature sensor are not changed in this procedure and are provided in Table 2 for reference only.

TABLE 1 - PMA 1/NODE 1 HEATER PRIORITIZATION

HEATER NAME	HEATER POWER (WATTS)	TEMP (deg C)	RANK	TEMP (deg C)	RANK	TEMP (deg C)	RANK
PMA 1 HTR 1A	68						
PMA 1 HTR 1B	68						
PMA 1 HTR 2B	68						
PMA 1 HTR 3A	68						
PMA 1 HTR 3B	68						
PMA 1 HTR 4A	68						
PMA 1 HTR 5A	68						
PMA 1 HTR 5B	68						
NODE 1 HTR 1A	274						
NODE 1 HTR 1B	174						
NODE 1 HTR 2A	110						
NODE 1 HTR 2B	80						
NODE 1 HTR 3A	180						
NODE 1 HTR 3B	180						
NODE 1 HTR 4A	180						
NODE 1 HTR 4B	180						
NODE 1 HTR 5A	180						
NODE 1 HTR 5B	180						
NODE 1 HTR 6A	180						
NODE 1 HTR 6B	180						
NODE 1 HTR 7A	99						
NODE 1 HTR 7B	99						
NODE 1 HTR 8A	66						
NODE 1 HTR 8B	66						
NODE 1 HTR 9A	121						
NODE 1 HTR 9B	145						

TABLE 2 - PMA1/NODE 1 HEATER CONFIGURATION TABLE
NODE 1/PMA 1 WARMUP

PMA 1 HEATERS (ALL TEMPS IN °C)

HEATER	AVAIL-ABILITY	UPPER SETPOINT	FAILURE UPPER LIMIT	LOWER SETPOINT	FAILURE LOWER LIMIT	CYCLIC LOAD DELTA
1A	Inh	21	45	18	-18	0
1B	Ena Opr	21	45	18	-18	0
2B	Ena Opr	21	45	18	-18	0
3A	Inh	21	45	18	-18	0
3B	Ena Opr	21	45	18	-18	0
4A	Inh	21	45	18	-18	0
5A	Inh	21	45	18	-18	0
5B	Ena Opr	21	45	18	-18	0

NODE 1 HEATERS (ALL TEMPS IN °C)

HEATER (SENSOR)	AVAIL-ABILITY	UPPER SETPOINT	FAILURE UPPER LIMIT	LOWER SETPOINT	FAILURE LOWER LIMIT	CYCLIC LOAD DELTA
1A (Snsr 1)	Inh	21	45	18	-18	0
1A (Snsr 2)		21	45	18	-18	0
1B (Snsr 1)	Ena Opr	21	45	18	-18	0
1B (Snsr 2)		21	45	18	-18	0
2A	Inh	21	45	18	-18	0
2B	Ena Opr	21	45	18	-18	0
3A (Snsr 1)	Inh	21	45	18	-18	0
3A (Snsr 2)		21	45	18	-18	0
3B (Snsr 1)	Ena Opr	21	45	18	-18	0
3B (Snsr 2)		21	45	18	-18	0
4A	Inh	21	45	18	-18	0
4B	Ena Opr	21	45	18	-18	0
5A (Snsr 1)	Inh	21	45	18	-18	0
5A (Snsr 2)		21	45	18	-18	0
5B (Snsr 1)	Ena Opr	21	45	18	-18	0
5B (Snsr 2)		21	45	18	-18	0
6A (Snsr 1)	Inh	21	45	18	-18	0
6A (Snsr 2)		21	45	18	-18	0
6B (Snsr 1)	Ena Opr	21	45	18	-18	0
6B (snsr 2)		21	45	18	-18	0
7A(Snsr 1)	Inh	21	45	18	-18	0
7A (Snsr 2)		21	45	18	-18	0
7B (Snsr 1)	Ena Opr	21	45	18	-18	0
7B (Snsr 2)		21	45	18	-18	0
8A	Inh	21	45	18	-18	0
8B	Ena Opr	21	45	18	-18	0
9A	Inh	21	45	18	-18	0
9B	Ena Opr	21	45	18	-18	0

NODE 1/PMA 1 PRE-INGRESS HEATER RECONFIGURATION

1. VERIFY PMA1 AND NODE 1 A HEATERS INHIBITED

PCS Node 1: TCS

NODE1: TCS

√PMA1 Htr A Availbty (four) - Inh

√NODE1 Htr A Availbty (nine) - Inh

2. INHIBIT PMA1 AND NODE 1 B HEATERS

PCS Node 1: TCS

NODE1: TCS

'PMA1'

NOTE

PMA 1 Heater 4B is not active and does not appear on the PCS NODE 1 TCS Display.

sel PMA1(NODE1) Htr[X(Y)]B [X] = 1 2 3 5

[Y] = 1 2 3 5 6 7 8 9

sel PMA1(Nod1) Htr[X(Y)]B Htr Commands

PMA1(Nod1) Htr[X(Y)]B COMMANDS

cmd Inh **Execute**

PMA1(Nod1) Htr[X(Y)]

√PMA1(Nod1) Htr[X(Y)]B Availbty - Inh

Repeat

3. MODIFY SETPOINTS FOR ALL PMA 1 HEATER TEMP SENSORS

PCS Node 1: TCS

NODE1: TCS

'PMA1'

NOTE

PMA 1 Heaters 2A and 4B are not active and do not appear on the PCS NODE 1 TCS Display.

sel PMA1 Htr[X(Y)]A(B) [X] = [1] [3] [4] [5]

[Y] = [1] [2] [3] [5]

[PMA1 Htr[X(Y)]]

sel PMA1 Htr[X(Y)]A(B) Htr Commands

[PMA1 Htr[X(Y)]A(B) COMMANDS]

NOTE

Specific values to be entered in the template command below for each PMA 1 Temperature Sensor are provided in Table 1 - PMA 1/Node 1 Heater Configuration Table. Values are provided for each of the five items in the template: Upper Setpoint, Failure Upper Limit, Lower Setpoint, Failure Lower Limit, and Cyclic Load Delta.

cmd Update PMA1 Htr[X(Y)]A(B) Temp Snsr Setpts
sel Upper Setpoint
Failure Upper Limit
Lower Setpoint
Failure Lower Limit
Cyclic Load Delta **Execute**

[PMA1 Htr[X(Y)]]

NOTE

The specific values to be verified in the step below are provided in Table 1.

√PMA1 Htr[X(Y)]A(B) Upper Setpoint
√Failure Upper Limit
√Lower Setpoint
√Failure Lower Limit
√Cyclic Load Delta

Repeat

4. MODIFY SETPOINTS FOR ALL NODE 1 HEATER TEMP SENSORS

PCS Node 1: TCS

[NODE1: TCS]

'NODE1'

sel NODE 1 Htr[X]A,B [X] = | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Nod1 Htr[X]

sel Nod1 Htr[X]A,B Htr Commands

Nod1 Htr[X]A,B COMMANDS

NOTE

1. Specific values to be entered in the template command below for each Node 1 Temperature Sensor are provided in Table 1. Values are provided for each of the five items in the template: Upper Setpoint, Failure Upper Limit, Lower Setpoint, Failure Lower Limit, and Cyclic Load Delta.

2. As depicted on the PCS NODE 1 TCS display, ten of the eighteen Node 1 Heaters have two temperature sensors (Heaters 1A, 1B, 3A, 3B, 5A, 5B, 6A, 6B, 7A, and 7B). For these heaters, setpoints for both temperature sensors must be changed. Values for both sensors are provided in Table 1.

cmd Update Nod1 Htr[X]A,B Temp Snsr Setpoints
sel Upper Setpoint
Failure Upper Limit
Lower Setpoint
Failure Lower Limit
Cyclic Load Delta **Execute**

Nod1 Htr[X]

NOTE

The specific values to be verified in the step below are provided in Table 1.

√Nod1 Htr[X]A,B Upper Setpoint
√Failure Upper Limit
√Lower Setpoint
√Failure Lower Limit
√Cyclic Load Delta

Repeat

TABLE 1 - PMA 1/NODE 1 HEATER CONFIGURATION
PRE-INGRESS HEATER RECONFIG

PMA 1 HEATERS (ALL TEMPS IN °C)

HEATER	AVAIL-ABILITY	UPPER SETPOINT	FAILURE UPPER LIMIT	LOWER SETPOINT	FAILURE LOWER LIMIT	CYCLIC LOAD DELTA
1A	Inh	21	45	18	-18	0
1B	Inh	21	45	18	-18	0
2B	Inh	21	45	18	-18	0
3A	Inh	21	45	18	-18	0
3B	Inh	21	45	18	-18	0
4A	Inh	21	45	18	-18	0
5A	Inh	21	45	18	-18	0
5B	Inh	21	45	18	-18	0

NODE 1 HEATERS (ALL TEMPS IN °C)

HEATER (SENSOR)	AVAIL-ABILITY	UPPER SETPOINT	FAILURE UPPER LIMIT	LOWER SETPOINT	FAILURE LOWER LIMIT	CYCLIC LOAD DELTA
1A (Snsr 1)	Inh	21	45	18	-18	0
1A (Snsr 2)		21	45	18	-18	0
1B (Snsr 1)	Inh	21	45	18	-18	0
1B (Snsr 2)		21	45	18	-18	0
2A	Inh	21	45	18	-18	0
2B	Inh	21	45	18	-18	0
3A (Snsr 1)	Inh	21	45	18	-18	0
3A (Snsr 2)		21	45	18	-18	0
3B (Snsr 1)	Inh	21	45	18	-18	0
3B (Snsr 2)		21	45	18	-18	0
4A	Inh	21	45	18	-18	0
4B	Inh	21	45	18	-18	0
5A (Snsr 1)	Inh	21	45	18	-18	0
5A (Snsr 2)		21	45	18	-18	0
5B (Snsr 1)	Inh	21	45	18	-18	0
5B (Snsr 2)		21	45	18	-18	0
6A (Snsr 1)	Inh	21	45	18	-18	0
6A (Snsr 2)		21	45	18	-18	0
6B (Snsr 1)	Inh	21	45	18	-18	0
6B (snsr 2)		21	45	18	-18	0
7A(Snsr 1)	Inh	21	45	18	-18	0
7A (Snsr 2)		21	45	18	-18	0
7B (Snsr 1)	Inh	21	45	18	-18	0
7B (Snsr 2)		21	45	18	-18	0
8A	Inh	21	45	18	-18	0
8B	Inh	21	45	18	-18	0
9A	Inh	21	45	18	-18	0
9B	Inh	21	45	18	-18	0

NODE 1/PMA 1 POST DRY OUT HEATER RECONFIGURATION

1. VERIFY A HEATERS INHIBITED AND B HEATERS ENABLE TO OPERATE

PCS Node 1: TCS

NODE1: TCS

√PMA1, NODE1 Htr A Availbty (thirteen) - Inh

√PMA1, NODE1 Htr B Availbty (thirteen) - Ena Opr

2. INHIBIT NODE 1 B HEATERS WITH TWO TEMP SENSORS

> NOTE
> For Node 1 Heaters with two temperature sensors, the heater must be inhibited prior to changing setpoints and failure limits. If the heater is not inhibited, the heater FDIR may consider the heater failed after setpoints and failure limits for one of the two temp sensors has been changed.

PCS Node 1: TCS

NODE1: TCS

'NODE1'

sel NODE1 Htr[X]B [X] = 1 3 5 6 7

sel Nod 1 Htr[X]B Htr Commands

Nod1 Htr[X]B COMMANDS

cmd Inh **Execute**

Nod1 Htr[X]

√Nod1 Htr[X]B Availbty - Inh

Repeat

3. MODIFY SETPOINTS FOR ALL PMA 1 HEATER TEMP SENSORS

PCS Node 1: TCS

NODE1: TCS

'PMA1'

> NOTE
> PMA 1 Heaters 2A and 4B are not active and do not appear on the PCS Node 1 TCS Display.

sel PMA1 Htr[X(Y)]A(B) [X] = [1] [3] [4] [5]

[Y] = [1] [2] [3] [5]

[PMA1 Htr[X(Y)]]

sel PMA1 Htr[X(Y)]A(B) Htr Commands

[PMA1 Htr[X(Y)]A(B) COMMANDS]

NOTE

Specific values to be entered in the template command below for each PMA 1 Temperature Sensor are provided in Table 1 - PMA 1/ Node 1 Heater Configuration Table. Values are provided for each of the five items in the template: Upper Setpoint, Failure Upper Limit, Lower Setpoint, Failure Lower Limit, and Cyclic Load Delta.

cmd Update PMA1 Htr[X(Y)]A(B) Temp Snsr Setpoints
sel Upper Setpoint
Failure Upper Limit
Lower Setpoint
Failure Lower Limit
Cyclic Load Delta **Execute**

[PMA1 Htr[X(Y)]]

NOTE

The specific values to be verified in the step below are provided in Table 1.

√PMA1 Htr[X(Y)]A(B) Upper Setpoint
√Failure Upper Limit
√Lower Setpoint
√Failure Lower Limit
√Cyclic Load Delta

Repeat

4. MODIFY SETPOINTS FOR ALL NODE 1 HEATER TEMP SENSORS

PCS Node 1: TCS

[NODE1: TCS]

'NODE1'

sel NODE1 Htr[X]A,B [X] = | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Nod1 Htr[X]

sel Nod1 Htr[X]A,B Htr Commands

Nod1 Htr[X]A,B COMMANDS

NOTE

1. Specific values to be entered in the template command below for each Node 1 Temperature Sensor are provided in Table 1. Values are provided for each of the five items in the template: Upper Setpoint, Failure Upper Limit, Lower Setpoint, Failure Lower Limit, and Cyclic Load Delta.

2. As depicted on the PCS NODE 1 TCS display, certain Node 1 Heaters have two temperature sensors (heaters 1A, 1B, 3A, 3B, 5A, 5B, 6A, 6B, 7A, and 7B). For these heaters, setpoints for both temperature sensors must be changed. Values for both sensors are provided in Table 1.

cmd Update Nod1 Htr[X]A,B Temp Snsr Setpoints
sel Upper Setpoint
Failure Upper Limit
Lower Setpoint
Failure Lower Limit
Cyclic Load Delta **Execute**

Nod1 Htr[X]

NOTE

The specific values to be verified in the step below are provided in Table 1.

√Nod1 Htr[X]A,B Upper Setpoint
√Failure Upper Limit
√Lower Setpoint
√Failure Lower Limit
√Cyclic Load Delta

Repeat

5. ENABLE TO BACKUP PMA1 AND NODE 1 A HEATERS

PCS Node 1: TCS

NODE1: TCS

NOTE

PMA 1 Heater 2A is not active and does not appear on the PCS NODE 1 TCS Display.

sel PMA1(NODE1) Htr[X(Y)]A [X] = 1 3 4 5

[Y] = 1 2 3 4 5 6 7 8 9

sel PMA1(Nod1) Htr[X(Y)]A Htr Commands

PMA1(Nod1) Htr[X(Y)]A COMMANDS

cmd Ena BU **Execute**

PMA1(Nod1) Htr[X(Y)]

√PMA1(Nod1) Htr[X(Y)]A Availbty - Ena BU

Repeat

6. ENABLE TO OPERATE NODE 1 B HEATERS WITH TWO TEMP SENSORS

PCS Node 1: TCS

NODE1: TCS

'NODE1'

sel NODE1 Htr[X]B [X] = 1 3 5 6 7

sel Nod1 Htr[X]B Htr Commands

Nod1 Htr[X]B COMMANDS

cmd Ena Opr **Execute**

Nod1 Htr[X]

√Nod1 Htr[X]B Availbty - Ena Opr

Repeat

TABLE 1 - PMA 1/NODE 1 HEATER CONFIGURATION TABLE
POST INGRESS HEATER RECONFIG

PMA 1 HEATERS (ALL TEMPS IN °C)

HEATER (SENSOR)	AVAIL-ABILITY	UPPER SETPOINT	FAILURE UPPER LIMIT	LOWER SETPOINT	FAILURE LOWER LIMIT	CYCLIC LOAD DELTA
1A	Ena BU	-7	45	-9	-12	0
1B	Ena Opr	-7	45	-9	-12	0
2B	Ena Opr	-1	45	-4	-7	0
3A	Ena BU	4	45	-2	-1	0
3B	Ena Opr	4	45	-2	-1	0
4A	Ena BU	10	45	7	4	0
5A	Ena BU	21	45	18	16	0
5B	Ena Opr	21	45	18	16	0

NODE 1 HEATERS (ALL TEMPS IN °C)

HEATER (SENSOR)	AVAIL-ABILITY	UPPER SETPOINT	FAILURE UPPER LIMIT	LOWER SETPOINT	FAILURE LOWER LIMIT	CYCLIC LOAD DELTA
1A (Snsr 1)	Ena BU	-30	45	-33	-34	0
1A (Snsr 2)		-30	45	-33	-34	0
1B (Snsr 1)	Ena Opr	-30	45	-33	-34	0
1B (Snsr 2)		-30	45	-33	-34	0
2A	Ena BU	-30	45	-33	-34	0
2B	Ena Opr	-30	45	-33	-34	0
3A (Snsr 1)	Ena BU	-30	45	-33	-34	0
3A (Snsr 2)		-30	45	-33	-34	0
3B (Snsr 1)	Ena Opr	-30	45	-33	-34	0
3B (Snsr 2)		-30	45	-33	-34	0
4A	Ena BU	-30	45	-33	-34	0
4B	Ena Opr	-30	45	-33	-34	0
5A (Snsr 1)	Ena BU	-30	45	-33	-34	0
5A (Snsr 2)		-30	45	-33	-34	0
5B (Snsr 1)	Ena Opr	-30	45	-33	-34	0
5B (Snsr 2)		-30	45	-33	-34	0
6A (Snsr 1)	Ena BU	-30	45	-33	-34	0
6A (Snsr 2)		-30	45	-33	-34	0
6B (Snsr 1)	Ena Opr	-30	45	-33	-34	0
6B (Snsr 2)		-30	45	-33	-34	0
7A(Snsr 1)	Ena BU	-30	45	-33	-34	0
7A (Snsr 2)		-30	45	-33	-34	0
7B (Snsr 1)	Ena Opr	-30	45	-33	-34	0
7B (Snsr 2)		-30	45	-33	-34	0
8A	Ena BU	-30	45	-33	-34	0
8B	Ena Opr	-30	45	-33	-34	0
9A	Ena BU	-30	45	-33	-34	0
9B	Ena Opr	-30	45	-33	-34	0